

**CARE SEEKING FOR COMMON CHILDHOOD
ILLNESSES IN THE CONTEXT OF INTEGRATED
COMMUNITY CASE MANAGEMENT SCALE UP IN
RURAL ETHIOPIA**

by

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Abstract

Problem statement: Diarrhea, Malaria and Pneumonia are the major causes of under-five mortality (U5M) in sub-Saharan Africa. These illnesses can be prevented with provision of child health interventions delivered at the community level. Ethiopia is currently scaling up integrated community case management (iCCM) of common childhood illnesses through health extension workers (HEWs) in rural community health posts to improve access to evidence-based treatments. However, utilization of HEWs at the health post for child illness has been found to be very low. Little is known about reasons for low utilization of HEWs and care seeking behaviors for this population.

Methods: Qualitative methods, including focus group discussions and in-depth interviews, were conducted among caregivers of U5 children and community health workers/volunteers in eight rural health post catchment areas. Paper 1 documents community-based sources of care, describes care seeking behaviors and strategies and explores sociocultural factors influential in care seeking for child illnesses. Paper 2 explores influential access barriers for utilizing HEWs delivering iCCM services at the health post. Quantitative analysis was conducted on data from a household cluster survey (12,000 households) evaluating differences in coverage and mortality between areas providing iCCM and routine community case management (CCM) services. Paper 3 assesses differences in utilization of HEWs for caregivers of sick children in iCCM areas those in routine CCM areas, determinants of utilization of HEW and health post services for child illness and reasons for non-use of HEW/health post services.

Results: Paper 1: Caregivers of sick children sought care from multiple sources within the landscape of available care and treatment options. The majority of care was sought

from informal sources. Choice of care provider was influenced by illness perceptions, perceptions of provider characteristics, influential social others and social networks, perceptions of medicines and caregiver autonomy. Paper 2: Participants noted a wide range of barriers for using HEWs delivering iCCM services at the health post. These barriers reflected both demand- and supply-side challenges. Participants noted that these services were often not: available, geographically accessible and acceptable for their child's illness. Additional influences included sociocultural factors which were reported to both aid and hinder utilization of HEWs at the health post. Paper 3: Caregivers in iCCM areas are marginally more likely to use the health post for child illnesses compared to caregivers residing in areas only with access to routine CCM services. Determinants for utilization of HEWs at the health post differed between the areas, with iCCM services reaching groups typically marginalized in service utilization studies. The primary reason given for not utilizing the HEW/health post related to caregivers perceptions of low severity for their child's illness.

Conclusions: Despite increases in coverage and quality of child health services delivered by HEWs through the strategy of iCCM, utilization remains very low. Many of the reasons for low utilization related to barriers to access and limited demand. In order to achieve the full potential of iCCM, efforts to minimize these remaining barriers and incorporate demand-generation activities need to be integrated within iCCM actions.

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Acronyms

ABH	Alliance for Better Health, PLC
ACT	Artemisinin-based Combination Therapy
ARI	Acute Respiratory Infection
CCM	Community Case Management of childhood illness
CHW	Community Health Worker
CIDA	Canadian International Development Agency
CSA	Central Statistical Agency
CSPro	Census and Survey Processing System
DHS	Demographic and Health Survey
EA	Enumeration Area
FGD	Focus Group Discussion
FMoH	Federal Ministry of Health (Ethiopia)
HC	Health Center
HDA	Health Development Army
HEP	Health Extension Program
HEW	Health Extension Worker
HIV	Human Immunodeficiency Virus
HP	Health Post
iCCM	Integrated Community Case Management for common childhood illnesses
IDI	In-Depth Interview
IFHP	Integrated Family Health Program
IIP-JHU	Institute for International Programs-Johns Hopkins University

IMCI	Integrated Management of Childhood Illnesses
IRB	Institutional Review Board
JHSPH	Johns Hopkins Bloomberg School of Public Health
L10K	Last 10 Kilometers Project
MDG	Millennium Development Goal
MICS	Multiple Indicator Cluster Survey
MoH	Ministry of Health
NGO	Non-Governmental Organization
OR	Unadjusted Odds Ratio
aOR	Adjusted Odds Ratio
ORHB	Oromia Regional Health Bureau
ORT	Oral Rehydration Therapy
RRR	Unadjusted Relative Risk Ratio
aRRR	Adjusted Relative Risk Ratio
RUTF	Ready-to-Use Therapeutic Food
SAM	Severe Acute Malnutrition
SSA	Sub Saharan Africa
U5M	Under-5 Mortality
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USD	United States Dollar
VCHW	Volunteer Community Health Worker
WHO	World Health Organization

Introduction

1. Background

1.1 Child survival in sub-Saharan Africa

The last two decades have witnessed significant gains in child survival worldwide.¹ As a leading indicator of the level of child health and overall development in countries, child mortality has been included in the millennium development goals (MDGs) as MDG-4 which calls for a reduction of two-thirds in mortality in children under-five from 1990 to 2015. With 2015 quickly approaching, however, most high-mortality nations are not on track to meet this goal.² Many of these countries are located in sub-Saharan Africa (SSA), a region which accounted for nearly half of the estimated 6.6 million global child deaths in 2012.³ Just three conditions—diarrhea, malaria and pneumonia—account for approximately one-third of global, under-five deaths with undernutrition as a common underlying cause of mortality.³ These deaths occur despite the availability of low-cost interventions to prevent and treat the main causes of child mortality. It has been estimated that two-thirds of child deaths could be avoided through the implementation of existing interventions.⁴

1.2 Access to health care and community-based child health programs

Treatment with oral rehydration therapy (ORT) for diarrhea, and artemisinin-based combination therapy (ACT) for malaria and antibiotics for pneumonia, has been shown to be particularly effective in reducing child deaths from these diseases.⁴

However, these treatments are often unavailable where they are most needed. Availability

is often lowest in those countries with the highest rates of child mortality.² Coverage* for basic treatments for these three conditions in SSA countries has been estimated at 32% for diarrhea, 38% for malaria and 34% for pneumonia.⁵

Access to care, and especially to quality care, is low for the poorest households within these nations. Children and caregivers from these households are less likely to have access to preventative and curative services, to be taken to an appropriate provider[†] when they are ill or to receive a high level of quality care when they do receive services.⁶⁻
⁷ These studies have shown that there is often sub-optimal coverage of effective child health interventions among rural and poor populations.⁸⁻⁹ Poor and rural children in SSA are also the most at risk for child mortality.¹⁰

One of the primary challenges for increasing and maintaining coverage of child health interventions is the lack of qualified health workers in low income countries. This challenge is especially pronounced for SSA with 39 of 57 countries having fewer than 23 health workers per 10,000 people.¹¹ In addition to low density, there is often unequal distribution of workers, lack of training, high turnover and international migration from poor countries to rich countries.¹² This shortage is also considerably higher in rural areas compared to urban areas within countries.¹¹ Health worker density has been shown to be highly associated with under-five mortality and is ten times higher in high-income nations compared to SSA nations.¹³ According to recent World Health Organization (WHO) estimates, the current workforce in SSA would need to be scaled up by as much as 140% to attain international health development targets such as the MDGs.¹⁴

* The proportion of under-five children receiving correct treatment for a given illness.

† Defined as care seeking from a medically-trained provider at a regulated public, NGO or private source.

The shortage of health workers and the related inability to reach those populations most in need through existing health facilities prompted a global movement to bring health care closer to local communities.^{2,15} This movement received a significant push in the Alma Ata Declaration of 1978.¹⁶ Following this declaration, many low-income countries began to prioritize primary care and increasing access to health services among the poor. To achieve wider access, many countries began to adopt community health strategies for delivering health interventions. One of the most widely adopted mechanisms was interventions involving community health workers (CHWs) delivering basic preventative and curative care, especially in poor and rural populations.¹⁷

However, by the early 1990s, interest and efforts in community health programs began to subside. This decline was due to a number of reasons with difficulties in scaling up and sustaining programs and a shift to vertical disease control programs as the most oft-cited reasons.¹⁸⁻²⁰ In the last decade, however, there has been a renewed interest in and emphasis on community-based health programs. Continuing difficulties in achieving widespread coverage, access and utilization of health services, severe human resource shortages, an emphasis on decentralized health services and challenges from the HIV/AIDS and other resurgent infectious disease epidemics have contributed to this renewed interest.^{17,21}

There is now an emerging evidence base for community-based interventions after nearly a decade of renewed interest. Interventions that have been effectively implemented at the community level include: health promotion and behavior change; preventative interventions such as mosquito net distribution and micronutrient supplementation; prevention of mother-to-child transmission of human immunodeficiency virus (HIV); and

case management of childhood illnesses.¹⁸ In a systematic review for community-based interventions for child illness, these interventions were associated with: increases in appropriate care seeking of 13% for pneumonia and 9% for diarrhea; an increase of 160% in use of ORS and 80% increase in use of zinc for diarrhea; and a 75% reduction in unnecessary use of antibiotics and 40% decrease in treatment failure rates for pneumonia.²² Many of these interventions have generally been shown to be cost-effective in comparison to facility-based services, especially those utilizing existing CHW cadres.²³ A recent Cochrane review found that lay and community health workers may reduce child morbidity by 14%, child mortality by 25% and neonatal mortality by 24%.²¹

It is now widely accepted that CHWs can play a crucial role in broadening access and coverage of health services in remote areas and can undertake actions that lead to improved health outcomes. CHWs are known by many different names in different countries and their roles may vary substantially by setting.¹⁸ A widely accepted definition of CHWs proposed by the WHO is:

Community health workers should be members of the communities where they work, should be selected by the communities, should be answerable to the communities for their activities, should be supported by the health system but not necessarily a part of its organization and have shorter training than professional workers.¹⁹

CHWs may be Ministry of Health (MoH) employees, paraprofessionals, volunteers or private sector workers.²⁴ Common child health activities performed by CHWs include immunization, breastfeeding promotion, growth monitoring, nutrition education, vitamin supplementation, therapeutic feeding, birth and newborn care, HIV prevention, prevention of mother-to-child transmission of HIV and treatment of childhood illnesses.¹⁸

Advantages of using CHWs include the fact that they constitute a large cadre of health

workers who can help overcome human resources constraints to scaling up child health interventions. CHWs are also geographically closer to rural populations who may not otherwise have access to care.^{19,25} Other advantages stem from their dual role as members of the community, where they may reduce cultural and linguistic barriers to seeking care and help to promote community mobilization and ownership of health programs.^{19,25}

1.3 Community case management of common childhood illnesses

Community case management of common childhood illnesses (CCM) is a strategy for improving coverage of child health interventions that is increasingly being promoted in and adopted by low-income countries. CCM programs target the primary causes of child mortality in low-income countries: pneumonia, diarrhea, malaria, neonatal infections and malnutrition.²⁵⁻²⁶ CHWs are assigned key roles within CCM and often use nationally-adapted Integrated Management of Childhood Illnesses (IMCI) guidelines for assessing, diagnosing and treating sick children.²⁶ For children under the age of five, the WHO and the United Nations Children's Fund (UNICEF) recently developed the training package, *Caring for the Sick Child in the Community*,²⁷ and recommend community treatment of diarrhea,²⁸ malaria,²⁹ pneumonia³⁰ and severe acute malnutrition (SAM)³¹ by CHWs.

Since this publication, the number of low-income countries in SSA with national policies supporting CCM has increased from 11 to 29 between 2008 and 2011.³² However, there are still policy concerns about the distribution of antibiotics for pneumonia and the presumptive treatment of malaria by CHWs in many settings.¹⁹ These concerns and resource constraints have led to the implementation of CCM only for selected diseases by many low-income countries' health ministries. A recent evaluation

of CCM policies found that 19 of the 29 nations adopting CCM policies have done so for all three of the common childhood illnesses.³² Policies for only two diseases, most often malaria and diarrhea, existed in four nations, and policies for only one of the three common childhood illnesses existed for the remaining six countries.³²

There is a large body of evidence demonstrating that CCM can increase coverage of appropriate treatments for common childhood illnesses among the rural poor.³³⁻³⁴

There is also evidence that CCM can lead to large reductions in child mortality.^{20-21,35-38}

While the current evidence base for CCM for malaria and diarrhea is limited, evidence for the impact of CCM on pneumonia is particularly strong with one meta-analysis showing a 24% reduction in under-five mortality³⁸ and another review showing 32% reduction in pneumonia-specific mortality.²² CCM of SAM has also been shown to be effective.³⁹ Mechanisms for these successful impacts have been suggested as CCM's potential for earlier detection and treatment, fewer severe cases of illness, fewer referrals and a reduced burden on health facilities and workers.²⁴ Community health programs such as CCM have also been shown to be of lower cost and higher value compared to facility-based services.⁴⁰⁻⁴²

Several assessments of community demand in low-income settings have suggested that community members often desire services that address a broad range of illnesses.⁴⁵ There is also significant overlap in the clinical presentation of childhood illnesses such as between malaria and pneumonia and frequent co-infections in children.⁴⁶ For these reasons, single disease and vertical programs often have limited or no impact.^{33,47} Single disease programs also fail to take advantage of contacts with sick children and their caregivers to address the multiple causes of childhood illness. Worse,

these programs may lead to a tendency to treat a single disease regardless of the actual cause(s) of illness.^{33,46}

1.4 Integrated community case management of common childhood illnesses

An integrated approach to treating common childhood illnesses has been suggested to overcome these limitations associated with CCM. Integrated community case management (iCCM) is a strategy designed to train, support and supply CHWs to provide clinical care for common childhood illnesses in a caregiver and child's community.⁴⁸ An integrated approach to common childhood illnesses has been suggested as having the following characteristics: 1) CHWs are trained to systematically detect signs of the major causes of mortality among children under five years of age in the area where they are working; 2) CHWs classify the child as having one or more of these conditions using an integrated algorithm or other decision-making tool; 3) if the area is malarious, the algorithm or tool should take into consideration the clinical overlap of malaria and pneumonia; 4) CHWs provide treatment for all of the conditions identified, or refer if the child is severely ill or requires a treatment the CHW does not keep in stock; and 5) CHWs counsel the caregiver of the sick child on how to administer all of the treatments provided.⁴³

As a strategy, iCCM is a community-based strategy that complements facility-based treatment in the IMCI framework. It is intended to deliver essential curative interventions for common childhood illnesses, focusing especially on areas with little or no access to facility-based services.²⁴ The strategy of iCCM provides a more comprehensive set of child health services and typically includes ORT and zinc for

diarrhea, ACT or chloroquine for malaria, antibiotic treatment for pneumonia and ready-to-use therapeutic foods (RUTF) for SAM. The strategy of iCCM was advanced in order to capitalize on contacts with sick children to address multiple causes of childhood illness and to improve the often limited impact of single-disease programs.^{46-47,49} As such, the strategy is also designed to promote equity in access and child health outcomes.⁴⁸ However, the strategy has been recognized as difficult to implement in many high disease-burden and resource-challenged settings.⁴⁸

Despite mixed evidence for the impact of iCCM programs,^{43,50-51} the WHO and UNICEF currently recommends integration of diarrhea, malaria and pneumonia treatment in community settings to improve equity in access to health care. There are several challenges that have been suggested for integrating case management including the difficulties in identifying danger signs when a child presents multiple signs and difficulties in CHWs following more complex treatment guidelines.^{50,52} However, there is evidence that CHWs can manage multiple illnesses, albeit with important limitations.^{50,52} An integrated approach to childhood illness using CHWs has been shown to improve access to care,³⁴ earlier care seeking⁵³⁻⁵⁶ and utilization of CHWs.⁵⁷⁻⁵⁸ The strategy of iCCM has also been shown to reduce child mortality.^{50,59-60} However, the evidence on iCCM is limited and few assessments of large-scale iCCM programs have been conducted, especially in SSA.^{20,61-62}

2. Study Site

2.1 Ethiopia

Ethiopia is one of only two African nations that largely retained their sovereignty during the early 20th century. It was a monarchy for most of its history until 1974. Throughout most of the 1970s and 1980s, civil conflict and a series of famines caused considerable hardship for the nation's population. In 1994, a constitution was adopted that led to Ethiopia's first multi-party elections. In the late 1990s a border war with Eritrea caused considerable destabilization and economic loss, particularly in the northern and central regions of Ethiopia. Recently, in 2011, a severe drought affected most of the eastern and northern regions of the country, from which they are only recently begun to recover. In 1996, an administrative realignment and decentralization plan divided the country into nine regions largely along ethnically-based boundaries.⁶³

Ethiopia is a landlocked east African nation with a population of 82.3 million, the second most populous nation in Africa. Eighty-three percent of the population resides in rural areas, and the primary occupation is subsistence agriculture. With a gross national income of 380 United States Dollars (USD) per year and 30% of the population living below the international poverty line of 1.25 USD per day, Ethiopia is one of the poorest countries in the world,⁶⁴ but the poverty rate is steadily decreasing.⁶⁵ The country ranked 173rd out of 187 countries in the 2013 human development index.⁶⁶ Income inequality in Ethiopia is generally low with a Gini coefficient of 0.36 which is significantly lower than most neighboring countries.⁶⁴ However, there is an increasing trend toward income inequality in rural areas while it is rapidly decreasing in urban areas.⁶⁵ Literacy is generally low (30%), especially for women (18%), and only 53% of girls complete

primary school.⁶⁴ Total fertility rates are still high at 3.9 children born per woman but have fallen rapidly over the previous two decades.⁶⁶ However, the population growth rate is still one of the highest in the world.⁶⁶ Life expectancy at birth is 62 years, and health expenditures are 15 USD per person per year.⁶⁴

Over 194,000 children die each year in Ethiopia before the age of five, and the country ranks sixth among nations for absolute burden of child mortality.⁶⁷ A large portion of these deaths are attributable to just three diseases: diarrhea (14%), pneumonia (21%), and malaria (2%).⁶⁷ However, Ethiopia has made considerable gains in reducing child mortality with the national under-five mortality rate falling from 210/1,000 live births in 1990 to 166/1,000 live births in 2000 to 88/1,000 live births in 2011.⁶⁸ In 2013, Ethiopia met MDG-4 by reducing child mortality by two-thirds from 1990 to 2015.⁶⁹ Nevertheless, coverage for many key child health interventions remains low. Table 1 provides key child health indicators for all Ethiopia. Figures 1 and 2 illustrate the trends in under-five mortality and causes of under-five deaths in Ethiopia for 2012.

2.2 Oromia region

Covering 284,538 square kilometers stretching from the western border in an arc to the southwestern corner of the country, the 2007 census reported its population at over 27 million, making it the largest of Ethiopia's nine ethnic regions in terms of both population and area.⁷⁰ Administratively, Oromia is divided into 17 zones, 245 *woredas* (districts), and 36 town administrations with 6,500 *kebele* subdivisions.[‡] Figure 3 provides a map of Oromia region. The Oromo speaking Afan Oromo represent the majority ethnic group in Oromia (88%), and in the country at large. In addition to Oromo,

[‡] A *kebele* is the lowest administrative unit, followed by *woredas*, zones and regions.

there is a significant presence of individuals of Amhara ethnicity (8%) speaking Amharic. Nearly half (48%) of the region's population is Muslim with smaller populations of Orthodox Christians (30%), Protestants (17%) and traditional religions (3%). Nearly four million are residents of urban areas giving an urbanization rate of 13.8%, slightly below the national average. The majority of the population (76%) works in agricultural-based or subsistence occupations.⁷¹

In 2010, Oromia's regional health system comprised of 44 hospitals, 1,013 health centers, 259 health stations and 5,407 community health posts. These facilities were staffed by 232 physicians, 692 health officers, 9,757 nurses, 1,035 environmental officers and 12,875 health extension workers (HEWs).⁷² Child health and care seeking for child health services tends to lag behind national averages for the region of Oromia. In the 2011 Ethiopia District Health Survey, care seeking rates for lower for nearly all child health services except antibiotic use for pneumonia.⁶⁸ Oromia also has significantly higher rates of under-five mortality (112/1,000), infant mortality (73/1,000) and neonatal mortality (40/1,000) compared to averages for all of Ethiopia—88/1,000; 59/1,000; and 37/1,000 respectively.⁶⁸ Table 2 provides key child health indicators for Oromia.

2.3 Ethiopia Health Extension Program

In 1993, a decentralized, four-tier system for health service delivery was introduced. At the lowest level is the primary health care unit comprised of one health center and five satellite health posts, serving a population of approximately 25,000. Each health post is staffed by two HEWs and serves one *kebele*, with a population of approximately 5,000 individuals.⁷³ Each health post is accountable to the *woreda* health bureau and the *kebele* administration, with technical support provided by the nearest

health center. Within the community, HEWs are assisted by volunteer community health workers (VCHWs). There are, on average, 12-15 VCHWs for each *kebele*. At the higher levels of the health sector are the district hospital, zonal hospital and specialized (referral) hospital serving a population of 250,000, 1 million and five million, respectively.⁷³

Figure 4 presents a visual diagram of Ethiopia's decentralized health system.

In recognition of the need to reach rural populations with health services, the Ethiopian Federal Ministry of Health (FMOH) launched the Health Extension Program (HEP) in 2004. The objective of the HEP is to provide universal coverage for primary health care. The HEP initially emphasized preventative services, but have since been expanded to include basic curative interventions. The primary output of the HEP has been to train approximately 35,000 HEWs to provide community-based, preventative and curative care.⁷³ Table 3 provides information on select HEW characteristics and Table 4 provides a list of the HEP service packages. Although the HEP includes an urban program, the large majority of HEWs work in rural areas where only 40 percent of the population lives within ten kilometers of a clinic or other health service delivery point.⁷⁴

The majority of the HEW's role is community-based, with HEWs expected to spend 75% of their time working in community outreach activities. These activities include training "model families" to serve as role models of good health practices and to transmit health messages and disseminating health promotion messages.⁷⁴ The HEP has since expanded to include basic curative care for some common childhood illnesses. The program expanded to include treatment of children with diarrhea with ORT, malaria with ACT, and SAM with RUTF. These services may be delivered both within the community, during outreach visits and at the health post.⁷⁴ A recent policy change has

expanded HEW roles by allowing them to treat pneumonia with antibiotics at the community level rather than the previous policy of referring cases to health facilities for treatment.⁷³

In 2010, the Ethiopian FMOH launched the Health Development Army (HDA) which has since been expanded to include Oromia in 2012. This initiative plans to recruit up to three million community volunteers to support HEWs in community health promotion. Females from model families identified by HEWs will be trained by HEWs and expected to engage five neighboring households in community mobilization activities targeting community health issues.⁷⁵

The Center for National Health Development conducted a prospective evaluation of the HEP through a series of cross-sectional surveys among households, HEWs and health posts.⁷⁶ The evaluation conducted from 2005 to 2007 suggested that the HEP had important effects on access to sanitation, use of contraceptives, postnatal care, appropriate treatment of diarrhea and malaria, mosquito net utilization and knowledge of HIV/AIDS. However, little or no effect was suggested with regards to antenatal care coverage, skilled attendants at birth, immunization or care-seeking for fever.⁷⁵ Community members surveyed in this evaluation reported disappointment that a broader range of curative services were not offered. These respondents suggested that the health post infrastructure, equipment and supplies were inadequate. However, most of the respondents appeared to be generally satisfied with the services of HEWs and the majority reported that HEWs were accessible and available in their communities.⁷⁶

A recent study assessing utilization of HEP services found high use of HEWs for HEP services in the previous 12 months (78%) by women in the community.⁷⁷ Utilization

was especially high for family planning (65%), immunization (63%) and child illness (60%) services and for women from model households, households visited during HEW outreach activities and women with a high understanding of HEP services.⁷⁷

2.4 Ethiopia iCCM evaluation

Until recently, HEWs were trained to assess and classify pneumonia, malaria, diarrhea and SAM but only provided treatment for malaria, diarrhea and SAM. In 2010, the policy was updated to include pneumonia treatment and to introduce iCCM. Ethiopia is now scaling up iCCM within the pre-existing HEP in six regions of the country: Amhara; Oromia; Southern Nations, Nationalities, and People's Region; Tigray; Gambela; and Benishangul-Gumuz. The Canadian International Development Agency (CIDA), UNICEF, United States Agency for International Development (USAID) and other partners are supporting this scale up. Following this policy change and with the support of CIDA and UNICEF, approximately 11,000 HEWs have been trained in iCCM (out of 35,000). This initiative aims to accelerate the reduction in under-five mortality by strengthening the health system and increasing access to and equity in high-impact, cost-effective preventative and curative interventions delivered by HEWs. Figure 5 provides the iCCM impact model for Ethiopia.

In the focus regions, CCM of childhood pneumonia with cotrimoxazole and zinc for treatment of diarrhea are being introduced in addition to the already existing CCM of malaria with ACTs, diarrhea with ORS and SAM with RUTF. In addition to adding CCM for pneumonia, the program is expected to strengthen the capacity of HEWs to assess, classify and treat malaria, diarrhea and SAM through refresher trainings, strengthened

supervision, improved supply chain management for essential drugs and supplies and improved monitoring and evaluation of HEWs and programmatic activities.

The Institute of International Programs at the Johns Hopkins Bloomberg School of Public Health (IIP-JHU) was commissioned by CIDA and UNICEF to conduct an independent prospective evaluation of the implementation of iCCM in Ethiopia. The independent evaluation assessed the impact of the rapid scale up of iCCM on increases in coverage in child survival interventions, reductions in mortality and improvement in nutritional status among children under-five years of age in Oromia region. Areas providing routine CCM (HEP) services and iCCM services were compared. Areas delivering iCCM services were fully implementing the iCCM program as of July, 2011 and the comparison areas were planning to begin implementation of iCCM no sooner than January, 2013. Table 5 provides a comparison of iCCM and routine CCM (HEP) programs.

3. Literature Review

3.1 Qualitative studies on care-seeking behaviors

Illness beliefs

A caretaker's beliefs about their child's ailments and symptoms are influential in the course of action taken to ameliorate their child's suffering. A caretaker's beliefs, in turn, are shaped by the available repertoire of local health beliefs that may be relevant to child health and childhood illness.⁷⁸ As several anthropologists have argued, these local beliefs are often multidimensional, dynamic, rational and pragmatic.⁷⁹⁻⁸⁰ In the literature, these beliefs are often understood or organized around broad etiological or causative relationships into local models of disease.

In a systematic review of 112 qualitative studies from SSA on household recognition of child diarrhea, malaria and pneumonia, Colvin and colleagues⁸² found five broad attributions of cause as the most commonly discussed by informants for the three illnesses in children: environmental characteristics,⁸³⁻⁸⁴ physical injury or vulnerability,⁸⁵ poor nutrition,^{83,86} pollution⁸⁷⁻⁸⁸ and natural pathogens.⁸⁴⁻⁸⁵ In addition, this review found less frequent mentions of supernatural,⁸⁹⁻⁹⁰ taboo- and sexual behavior-related⁹¹⁻⁹² and exposure to "modern" objects and lifestyle-related causes discussed by informants.^{85,93} However, several of the researchers from reviewed studies caution that the lower frequency of these responses might be more a result of reluctance to admit belief to researchers, and findings might be biased toward more biomedical forms of causality.⁹⁴⁻⁹⁵

Despite the diversity of cultural and ecological contexts in SSA, several patterns in explanations and typologies relating to diarrhea, malaria and pneumonia emerged in the literature. Biomedical and local models of etiology were not mutually exclusive and

often co-existed, even if seemingly contradictory.⁹⁶ In most settings, this was hypothesized as resulting from the application of different theories and explanations to address different levels of cause.⁹⁶ Second, there is significant variability and complexity of local models, even within the same population or even household.⁹⁶ Third, local models and terminology ranged from extremely specific to non-specific⁹⁷ and there was often no clear line between one illness and another.⁹⁸ Fourth, “upstream factors” (e.g. poor sanitation and unclean water) were frequently recognized but not necessarily included in mechanisms that connected those factors to a specific illness.⁸² Fifth, local models often have social consequences with moral and identity-based overtones.⁹⁰ Finally, there was often variation between rural and urban locales with the latter more often reporting beliefs that accord with biomedical theories of cause and treatment.⁸⁸

Some disease-specific etiological patterns have been suggested for sub-Saharan African settings. For example, causation beliefs related to pneumonia and malaria are often related to environmental or humoral-based etiological theories with pneumonia often associated with cold and dampness^{90,99} while malaria and fever is often associated with heat and dryness.¹⁰⁰ These beliefs have also been reported to extend to negligence of the caregiver in exposing or failing to prevent exposure of children to these conditions.⁸⁵ Convulsions, in addition to being associated with cold are also frequently seen as supernaturally caused (e.g., by spiritual forces).⁹⁰ Diarrhea, on the other hand is often seen as resulting from pollution-oriented causes such as dangerous breastfeeding practices and sexual taboos as well as dirty water and food.¹⁰¹ Teething is another commonly reported cause of diarrhea in children.¹⁰² Malaria is often associated with

mosquitoes in several studies, but the mechanisms relating mosquitoes to malaria are often unclear.¹⁰³⁻¹⁰⁴

Role of social relationships

The majority of research in household behaviors focuses on primary caregivers, most often a child's mother.⁸² However, in more complex cases that often require a significant input of family resources, recognition of and response to child illness is often a social affair that engages an array of family and community members.^{91,105} These members may involve mothers-in-law, grandmothers, male partners, other family members, friends, neighbors, traditional healers, community leaders and other local experts and opinion leaders.^{91,105} Social relationships and their dynamics often serve a number of functions such as mobilizing information, expertise and resources for a particular child illness episode.¹⁰⁶

One important social dynamic frequently discussed in the literature is the role of male partners. A consistent finding is the need for mothers to get permission of their husbands to seek care outside of the home, especially given the financial considerations involved in care seeking.^{91,107} Male control of decision-making and financial resources is an oft-cited barrier to prompt care seeking outside the home.^{91,107} Likewise, elder family members have also been shown to have significant power in care-seeking negotiations and in providing information and resources related to recognition and treatment of child illness.¹⁰⁵ These actors are often engaged when symptoms are severe, diagnosis is unclear or treatment is costly and may extend beyond the household, encompassing household's local "therapy management group" for the best course of action.¹⁰⁸ Consultation has been suggested as a barrier of prompt care by delaying treatment, but also as a significant

source of social and financial support as well as a means for minimizing individual blame for negative outcomes.¹⁰⁵ Both higher education and increased control over financial resources for a mother have been suggested to decrease the social pressures that often act as barriers to prompt care-seeking for their children.^{92,109}

Household treatment strategies

There is a growing recognition of “health care pluralism”; that a considerable amount of care seeking often involves informal providers, and individuals use multiple sources of care.⁷⁹⁻⁸² The sequential, simultaneous and often partial use of different providers has been documented, suggesting complex and mixed “patterns of resort.”¹¹⁰ In much of the literature, these sources are often distinguished as “traditional” in contrast to biomedical options, which are often highlighted as the endpoints of analysis. However, as Leach et al. argue based in their work in Guinea, other distinctions based on familiarity with source, types of payment and types of drugs are more salient to caregivers.¹⁰⁹ According to these authors, focusing solely on utilization of biomedical options limits the ability of researchers to understand the full range of care-seeking behaviors.

Colvin et al.’s “middle layer,” encompassing options available for care seeking from the home to the clinic, outlines a range of community-based options for caregivers seeking treatments for childhood illnesses.⁸² These options commonly include traditional medicines and healers, local drug vendors, other private providers and CHWs. Choosing from among these sources has often been described as a “trial-and-error process” and as consisting of pragmatic choices aimed at minimizing cost and uncertainty and maximizing the chances for cure.^{82,111-112} In addition to cost, the choice of a particular provider has been suggested as partly determined by recognition of illness symptoms,¹¹³⁻

¹¹⁴ perceptions of disease seriousness,^{113,115} access-related factors,^{91,116} gender,¹¹⁷⁻¹¹⁸ perceived quality of care¹¹⁹⁻¹²⁰ and successful prior experience.^{96,121}

Switching care providers and seeking alternatives is a common strategy taken by caregivers when treatments fail to alleviate symptoms or fail to meet caregiver expectations.^{113,122} Interactions with social networks often intensify as an illness becomes more severe and different modes of treatment fail.^{89,117,123} Expectations of caregivers and significant social others relate to perceptions of a provider's expertise and appropriateness, the quality of interactions between caregiver and provider and the power of drugs and treatments received.¹²² Going beyond narrow conceptions of "rational drug use" and "adherence,"¹²⁴ some studies are beginning to look at caregiver expectations and perceptions of drugs and treatments received from providers.^{109,125} These studies suggest complex preferences and ideas relating to demand for and qualities of drugs, especially relating to "power" of drugs, with caregivers often preferring providers that give tangible treatments and powerful drugs.¹²⁶⁻¹²⁷ Others caution that caregivers assess the fit between their perceptions of the power of various treatments and the severity of symptoms, often leading to perceptions of the inappropriateness of certain treatments.¹²⁸⁻¹²⁹

3.2 Quantitative studies on determinants of health services utilization

The quantitative literature base on care seeking in SSA has identified a range of determinants associated with utilization of appropriate health care facilities. These determinants include: distance,¹³⁰⁻¹³² religion and ethnicity,¹³³⁻¹³⁵ household wealth,^{8,136-137} maternal age¹³⁸⁻¹⁴⁰ maternal education,^{131,136-137} child's age¹³⁹ and illness type.^{139,141} Transportation or walking distance is frequently cited as an important barrier to health care access in rural SSA.¹⁴²⁻¹⁴³ The effect of distance is related to time consumption and

the cost of transportation which have been shown to be major deterrents in care-seeking practices in SSA.^{130-132,144} Household wealth is another frequently studied proxy used for exploring financial barriers to health care access in SSA.^{8,136,145} Caregivers from wealthier households are more likely to have resources available for direct and indirect costs associated with appropriate care seeking and be aware of the availability and benefits associated with appropriate care seeking compared to their lower socioeconomic status counterparts.¹⁴³ The effect of increases in maternal education status and age on increases in appropriate care seeking has also been often explored in SSA and can also be related to increased awareness of the availability and benefits associated with appropriate care seeking^{131,136,139} and potentially to higher female autonomy in care seeking decisions.¹⁴²⁻¹⁴³ Cultural and maternal perceptions of illness severity and type are also frequently observed determinants associated with care seeking from an appropriate source with caregivers perceiving higher severity more likely to utilize appropriate health facilities.^{141,143} Although the literature base on care seeking in Ethiopia is small, this study has broadly similar findings compared to studies conducted in Ethiopia.¹⁴⁶⁻¹⁴⁸

The studies above overwhelmingly focused on utilization of sources of care outside of a caregiver's community. However, there is likely to be differing determinants for health workers in local community settings, often providing free services. CHWs have been regarded as key agents in improving access and health for their communities, yet surprisingly little is known about their relationships with the communities in which they work and the factors that promote their utilization.²⁰⁻²¹ Much of the literature base has focused on supply-side issues, but new studies are increasingly focused on the demand for CHW services.²⁰ A seminal work conducted by Sauerborn et al. in Burkina Faso

showed low utilization of CHWs due largely to low perceptions of severity, CHW skills and a high degree of by-passing the CHW for more skilled providers.¹⁴⁹ In the wake of this study, research in SSA has found knowledge that CHWs are available,¹⁵⁰ gender of CHWs¹⁵¹⁻¹⁵² and community participation in the CHW program¹⁵¹ as influential determinants in utilization of CHWs. However, few studies followed up on these findings. The importance of focusing on demand-side factors has increased recently due to a study by Nsungwa-Sabiiti and colleagues in Uganda who showed that despite a high degree of potential access, program effectiveness and quality of CHW services, realized access or utilization by community members of CHWs was low.¹⁵³ In Kenya, looking at determinants of utilization of CHWs for children with fever, Kisia et al. found caregivers from poorer households, with greater knowledge of available services and who had previously used CHWs as the only significant determinants of higher CHW utilization.¹⁵⁴ However, a study in Uganda by Rutebemberwa et al. found that caregivers from the middle quintiles were significantly more likely to use CHW services than caregivers from the poorest quintiles.⁵⁸ This finding suggests the potential for Victora et al.'s "inverse equity hypothesis," in which caregivers from wealthier households are more likely to have the resources to take advantage of new interventions and poorer households benefit later, potentially undermining the equity focus of CHW initiatives.¹⁵⁵ In another study in Uganda, for caregivers of children with fever, Mukanga et al. found shorter distance to the nearest CHW and acceptability of services as significant determinant of utilization.¹⁵⁶

4. Conceptual Framework

This study uses the conceptual framework put forth by Andersen's¹⁵⁷⁻¹⁵⁸ model of for organizing influential factors for utilization of health services, accounting for critiques put forth by Kroeger.¹⁵⁹ According Andersen, use of health care services is a function of three sets of individual characteristics: (i) predisposing characteristics or the sociocultural characteristics of individuals existing prior to an illness, e.g., ethnicity, education, age; (ii) enabling characteristics relating to the logistical aspects of obtaining care, e.g., household wealth, distance from the health facility; and (iii) need characteristics, i.e., personal and professional judgments about health status and need for care and treatment.¹⁵⁷ In Kroeger's critique of the Andersen model, use of health services was expanded to include a wider range of available health services and the characteristics of those services as a key determinant of utilization. According to Kroeger utilization of a health service depends on: (i) characteristics of the individual ("predisposing factors" and "enabling factors"); (ii) characteristics of the disorder and their perception, e.g., etiological model, perception of severity, expected benefits of a treatment; and (iii) characteristics of the health service and their perceptions, e.g., accessibility, appeal, acceptability, costs.¹⁵⁹ Figure 6 gives a visual of Andersen's model and Figure 7 gives a visual of Kroeger's model. In addition, Kroeger's model was presented as an attempt to combine anthropological/qualitative ("pathway models") and socio-medical/quantitative ("determinants models") approaches.¹⁵⁹

Kroeger's discussion of characteristics of the health service is similar to Penchansky and Thomas's "four As model." Penchansky and Thomas's definition of access as a "fit" between those seeking health services and health services themselves is

commonly used in health systems research.¹⁶⁰ According to these authors, access has four dimensions: availability, geographic accessibility, affordability and acceptability.¹⁶⁰⁻¹⁶¹ Availability consists largely of the presence of qualified health providers and quality health commodities at a health post. Geographic accessibility relates to the spatial or geographic relationship between providers and users of health care. Affordability is the financial ability of a user to access care. Acceptability relates to attitudes of users of health care toward providers and services.¹⁶¹ These dimensions address factors occurring at the supply- and demand-side levels and interactions between these levels.¹⁶¹⁻¹⁶³ This study uses Rutherford et al.'s¹⁴³ critique and modification of the Penchansky and Thomas model, which expands the four dimensions to explore also the role of social networks, female autonomy and time availability in impeding or facilitating access.

5. Rationale for Study

Despite the pivotal role of HEWs at the community health post as the first point of contact for sick children in both the HEP and iCCM initiatives, utilization has been found to be very low.¹⁶⁴ Estimates of utilization of the HEW/health post for sick children range from 4% to 22% with large variation between regions and by illness.¹⁶⁵⁻¹⁶⁶ The 2007 HEP survey found that a health post treated, on average, 15 children with malaria per month.⁷⁶ In Oromia region, HEWs treated an average of only 7.5 children per month.⁷⁶ Another survey found utilization of HEWs to be lowest in Oromia region of four regions assessed.¹⁶⁶ A recent quality of care survey conducted as part of the IIP-JHU evaluation of iCCM scale up found a generally high level of quality of services in relation to coverage, drug stock outs, HEW skills and other quality indicators.¹⁶⁷ These findings suggest that even if efficient and high quality services are offered, the desired health outcomes may not be achieved if services are not timely and properly utilized by caregivers. These data suggest that implementation of iCCM without specific efforts to promote utilization of HEWs by community members may not achieve the expected impact in terms of reduction in child mortality.

Surveys have also found low rates of appropriate care seeking[§] for Oromia. Since the implementation of the HEP and iCCM initiatives, few published studies have explored care seeking behaviors and reasons for low levels of utilization of existing programs. The majority of existing studies on care seeking in Ethiopia have focused on only one illness (malaria) and took place before the scale up of recent initiatives.^{55,146,168-}

¹⁶⁹ Furthermore, very few studies have assessed the effects of these programs by specific

[§] Appropriate source was defined as: providers in hospitals, health centers, health post, private and non-governmental organization (NGO) health facilities. It excludes pharmacy, shop/vendor and traditional healers.

sub-populations and it is uncertain whether they are reaching the most vulnerable sub-populations and promoting equity as intended.¹⁴⁶

The IIP-JHU baseline coverage survey conducted in Jimma and West Hararghe zones for the iCCM evaluation found care seeking and appropriate treatment for malaria, diarrhea and pneumonia in children under five from appropriate sources to be fairly low and care seeking from health posts/HEWs to be extremely low.¹⁶⁵ Table 6 provides care-seeking data from the iCCM evaluation baseline survey. This situation is of significant concern for project partners such that UNICEF has commissioned this study to explore the factors responsible for this low utilization of HEWs delivering iCCM services.

6. Knowledge Gaps Addressed

The results of this thesis research aimed to provide evidence of the utility of the iCCM strategy by CHWs in the context of free healthcare for children in rural Ethiopia. The study is among the few that assess care-seeking behaviors and factors influential in utilization of HEWs following the scale up of iCCM services in Ethiopia from the perspective of caregivers themselves. Previous work done in this area in Ethiopia is sparse and no studies have been conducted in Oromia or for multiple child illnesses. Globally, most research has focused on supply-side determinants of health care utilization and on the endpoint of utilization of formal health care services. This research contributes to a small but growing literature base beginning to look at demand-side factors. It also seeks to explore the large degree of care-seeking behaviors that occur outside of formal health services that are rarely captured in care seeking studies. This study is among the first that explore determinants of utilization of CHWs delivering iCCM services. This will be the first assessment to highlight potential determinants that are related to access constraints and demand for existing community health interventions in rural Oromia. Finally, this study will be the first to explore these issues using a mixed-methods approach, strengthening the validity and scope of findings.

The paper uses three lenses to look at care seeking in rural Ethiopia. First, from an anthropological perspective, it looks at child illness and care seeking from a social constructivist approach looking at these phenomena as partly determined by local sociocultural processes such as beliefs about health/illness and perceptions of sources of support, care and treatment, taking place in rural Ethiopian settings.⁸⁰ From an applied anthropological perspective, paper two was a rapid assessment of challenges associated

with using HEWs (or CHWs) from the perspective of caregivers themselves and took a critical approach to public health attention on supply- as opposed to demand-side interventions.⁸¹ These two papers work with and provide additional context for paper three, providing quantitative data from a survey to look at sociodemographic determinants of care-seeking patterns as well as focusing on differences between two models of child health intervention. Taken together, all three papers provide a comprehensive and holistic assessment of care seeking for common childhood illnesses in this setting.

More information is needed on care seeking behaviors and determinants of utilization of HEWs providing quality child health services at the health post. Findings from this study can be used to highlight barriers to access and to inform demand-generation activities. In light of recent survey findings of low utilization and Ethiopia's beginning scale up of the HDA, this study's findings can be immediately used to inform the development of a more comprehensive iCCM intervention package attending to both local communities' and caregivers' child health needs.

7. Methods

7.1 Objectives

The primary objectives and research questions associated with each objective of this research study are as follows:

(1) Qualitatively document care seeking behaviors and perceptions of available care sources of caregivers of under-five children sick with diarrhea, fever and respiratory illnesses in rural Oromia.

- How do caregivers conceptualize child illness?
- What terms are used and how do caregivers conceptualize diarrhea? Malaria? Pneumonia?
- When and why does a caregiver seek care outside the household for a sick child?
- What sources of care are available in local communities for sick children?
- What are caregiver perceptions of available sources of care? Why do caregivers choose one source over an alternative?
- Who is involved in the care-seeking process? Who makes care-seeking decisions?
- What are the decision-making dynamics in seeking care?

(2) Qualitatively explore the barriers and enabling factors influencing caregiver utilization of child health services provided by HEWs.

- Do caregivers perceive HEW services as available? Accessible? Affordable? Acceptable?
- What other sociocultural factors influence use of HEWs at the health post?

(3) Quantitatively assess utilization of HEWs delivering iCCM services and predictors of use compared to routine CCM areas.

- Does iCCM promote utilization of HEWs compared to the routine CCM program?
- What sources do caregivers use for sick children and how do these compare to use of HEWs?
- What predisposing factors influence HEW utilization?
- What enabling factors influence HEW utilization?
- What need factors influence HEW utilization?
- What are the primary reasons given for not using the HEWs at the health post?

7.2 Study organization

Funding for this study was provided by UNICEF. IIP-JHU was responsible for the conception, design and implementation of the study. IIP-JHU identified and contracted a private Ethiopian research firm, Alliance for Better Health Services, PLC (ABH), to conduct the fieldwork, including recruitment and training of data collectors and data collection. IIP-JHU provided oversight for all aspects of the study.

7.3 Study population

The study was conducted in Jimma and West Hararghe zones of Oromia region in Ethiopia. Figure 8 provides a map of the two zones. Jimma zone is located directly west of Addis Ababa and West Hararghe is located directly east. Zonal capitals of Jimma town and Asebe Teferi are approximately five to six hours from Addis Ababa by car. Jimma has a population of 2.9 million and is approximately 15,600 square kilometers in size.

West Hararghe has a population of 2.1 million and is approximately 15,100 square kilometers in size.

The two zones were selected for this study because they are the study areas selected for the iCCM evaluation, with randomized iCCM intervention and comparison *woredas*. Table 7 lists evaluation *woredas* by zone and intervention and comparison areas. The zones were selected for the evaluation because the iCCM intervention was phased-in in Oromia and these zones were chosen based on their large size, existence of strong iCCM implementation partners (Last 10 Kilometers (L10K)-John Snow International in Jimma and Integrated Family Health Program (IFHP)-Pathfinder International in West Hararghe) and accessible geographic location.

7.4 Qualitative study

7.4.1 Inclusion criteria

The inclusion criteria for the qualitative study were as follows:

- a. Health posts: All functional health posts^{**} within zones selected for the quality of care survey¹⁶⁷ and delivering iCCM services were included in the sampling frame. Health posts from comparison areas were not included in this study.
- b. Caregivers: Caregivers were mothers and fathers of under-five children residing in the catchment area (*kebele*) of selected health posts.
- c. HEWs: All HEWs providing iCCM services in selected health posts will be included.
- d. VCHWs: All VCHWs providing iCCM services in selected health posts will be included.

^{**} A functional health post is defined as a location where at least one HEW is currently assigned to provide services to the community. A health post will be considered functional even if the physical health post structure has not been constructed.

7.4.2 Research methods

The study design was informed by rapid ethnographic assessments developed as part of applied anthropological research methods for child health and care-seeking behaviors.^{81,110} Data were collected primarily through the following methods:

1. Focus group discussions (FGDs) among female caregivers
2. In-depth interviews (IDIs) among caregivers, HEWs and VCHWs
3. Village walkthroughs and health post observation

FGDs were conducted to clarify the terminology and explore a range of issues involved in child illness and care-seeking behavior, highlight similarities and disagreements in the perceptions of participants and identify salient sociocultural norms. FGDs were flexible, iterative and based on a semi-structured FGD guide located in Appendix 1. FGDs focused on conceptualizations of child illness(es) and perceptions of local sources of care available for sick children.

IDIs were conducted to explore patterns and strategies of care for a sick child. IDIs were conducted with both male and female caregivers. Paired husband/wives were selected to provide interviews in order to explore differences in perceptions between genders. The caregiver was probed to provide a narrative of all actions taken and rationales for key actions over their child's recent illness episode.¹⁷⁰ The semi-structured IDI guide for caregivers is given in Appendix 2. Caregiver FGDs and IDIs were supplemented with IDIs among HEWs and health volunteers to provide additional context about child illness issues in selected communities. The semi-structured community health worker/volunteer guide is located in Appendix 3.

All research guides consisted of three modules. The first module consisted of

“explanatory models”⁸¹ of common childhood illnesses. For FGDs and IDIs with HEWs and health volunteers, this covered the main illnesses in participants’ villages as outlined by the participants and provided terminology as well as perceptions of cause and severity. This gave a sense of prevalent or salient child health problems for selected sites. For IDIs with caregivers, models were elicited for the illness of the caregiver’s child. The second module consisted of treatment preferences for these illnesses in FGDs and care seeking narratives for caregiver IDIs. Paper one reported largely on these first two modules. The third module consisted of perceptions of HEWs and child health services provided at the health post for both FGDs and IDIs. This module also includes prompts about why a caregiver did/did not use the HEW at the health post for their sick child. Paper two reported largely on findings from this module with contextual information from other modules.

Village walkthroughs were performed to observe the geographic characteristics of selected *kebeles* and to identify sites identified as providing care and treatments for sick children (e.g., local shops, markets, mosques, etc.). Unstructured observations of the health post were performed to provide context on the characteristics of health posts such as appearance, waiting times, supply stocks, etc.

7.4.3 Sample selection and recruitment

Eight health posts and their corresponding *kebele* catchment areas were selected from the sampling frame of functional health posts providing iCCM services. Sites were purposively selected to achieve maximum variation based on existing data for utilization of the health post and distance from the nearest referral facility (health center).¹⁷¹ Four sites were selected from Jimma and four from West Hararghe. Table 8 provides this

information for each selected site. This selection process allowed for a look at differences between sites based on these characteristics hypothesized as influential in access to health post services.

Local guides, community leaders and health workers/volunteers were engaged to assist in identifying caregivers of under-five children in their communities. Participants in FGDs were randomly selected from these lists. HEWs were also asked to identify caregivers who had ever utilized the health post for a child illness. These caregivers were oversampled for FGDs, which were stratified by use of the HEW/health post, in order to highlight potential differences between users and non-users. Local guides assisted in the recruitment of selected participants. If participants were unavailable, alternates were randomly selected from the list in order to fill their place. For IDIs, women from model families assisted in identifying caregivers of children with a recent child illness. At least one of these women was selected from each sub-village within a *kebele* to increase the likelihood that hard-to-reach caregivers would be identified. Although complete enumeration of such caregivers was not feasible, lists of potential participants averaged approximately 30 caregivers per site. Potential respondents were randomly chosen from these lists. At later research sites selected later in the research process, respondents were selected based on theoretical sampling (based on maternal age, child age, distance of household from the health post and type of child illness) to allow the research team to investigate particular questions or issues that are of interest after the initial data analyses.¹⁷¹ Women from model families assisted in the recruitment of caregivers of an under-five child with a recent child illness. Potential informants were screened to ensure

that they met the requirements for interview. Mothers were asked recruit their husbands for IDIs with male caregivers.

7.4.4 Sample size

Sixteen FGDs were held with female caregivers of under-five children with eight each from Jimma and West Hararghe zones, including 132 individual caregivers. FGDs were stratified by previous HEW/health post use with eight from each category. For IDIs, 40 female caregivers, 16 male caregivers and 22 HEWs and VCHWs were interviewed. Table 9 gives the total sample for each of these research methods accounting for stratifications and for each site.

Sample sizes were consistent with guidelines for appropriate sample sizes for qualitative research techniques.¹⁷²⁻¹⁷³ The total sample size was determined based on the concept of data saturation.¹⁷⁴ The principal of data saturation for this aim will be followed for the region of Oromia as a whole rather than for each *kebele* site. The aim was to get a sufficiently representative sample for rural Oromia rather than for each *kebele*. FGDs and IDIs were held until no new general themes were emerging.

7.4.5 Data collection procedures

Research team and training

The research team consisted of four college-educated, Ethiopian data collectors experienced in qualitative research and fluent in Afan Oromo and English. Data collectors were recruited by the local partner research firm, ABH Services, PLC. Data collectors were trained for five days from December 11 to December 15, 2012. Training was provided by the primary researcher. Training covered qualitative methodology, selected child health topics, study procedures, data collection instruments, translation and

transcription and study ethics. The final three days of training focused predominantly on role-play and simulations of FGDs and IDIs.

FGD and IDI guides were initially translated by a professional translator affiliated with ABH and modified with input from data collectors over the course of training. A two-day pre-test was conducted at a *kebele* site in Omo Nada *woreda*, Jimma zone from December 18 – 19, 2012. The pre-test provided the opportunity to test the study procedures, refine the research guides and further train data collectors under conditions that simulated the qualitative research. It followed the procedures of the study to replicate actual data collection to the fullest extent possible.

Data collection

Data collection took place for 30 days beginning on December 20, 2012. Prior to conducting data collection at each site, permission was received from *woreda* health bureaus for each site. At each site, the research team engaged HEWs and community leaders to discuss the purpose and conduct of the research and strategize selection of the research participants. The research team, under the supervision of the primary researcher, spent two to three days at each site conducting research methods.

The research guides were flexible and general, including a broad spectrum of questions and probes relating to the study objectives. Questions and probes were continually reviewed and refined during data collection to account for new or emerging themes. The informants and participants themselves guided the direction of the IDI or FGD based on issues they self-prioritized. However, data collectors ensured that the key topics were addressed in each research interaction and therefore allowed generalization of themes across informants and participant.

At the start of each IDI and FGD, the study's consent form was read and explained in detail. Informed consent was given orally. FGDs were conducted at either local schools, village halls or, when available, a private room at the health post, by two data collectors (facilitator and note taker). IDIs were conducted at the caregiver's home by one data collector and were held in as much privacy as possible. All IDIs and FGDs were audio recorded.

Short debrief sessions were held with each data collector upon completion of each FGD or IDI and facilitated by the primary researcher. Longer debrief sessions were held with the research team upon completion of each site. Research conduct and significant a priori and emerging themes were discussed and served as the basis for modifications of study techniques and guides. The primary researcher included key points from debrief sessions in field notes.

Data management

Data were translated and transcribed into English from Afan Oromo by data collectors onto computers. Initially, under the supervision of the primary researcher, two days for translation and transcription was taken between each site to ensure quality of translation and transcription and to provide the research team with insight into emerging themes. Back translation was performed on selected sections in order to assess quality of translation. Modifications for the study guide and potential probes were discussed based on these findings. Afan Oromo terms for significant themes such as disease or medicine names were kept in Afan Oromo next to their English translations. Data collector notes from the FGDs and IDIs were also transcribed and amended to the final transcriptions.

After the first two sites, data collectors translated and transcribed FGDs and IDIs on their own.

7.4.6 Data analysis

Transcripts and field notes were entered in Atlas.ti version 6.0 (Development SS, Berlin), a computer software program used to assist in coding of qualitative data. Separate analyses were performed for both qualitative objectives. For the first paper, grounded theory as conceived by Charmaz was used to guide data analysis.¹⁷⁵ Grounded theory was chosen because little was known about care-seeking behaviors in these areas and the goal was to derive a general “theory” outlining care seeking patterns. Dominant themes were identified through open coding of a select number of transcripts to construct a code book. Axial coding, relating open codes to each other, was also performed. Memos were created to organize patterns in key themes and visual representations (e.g., patterns of sources used). For the second paper, *a priori* codes based on Rutherford et al.’s and Penchansky and Thomas’s access models were used as thematic categories.^{143,160} These themes consisted of availability, geographic accessibility, affordability and acceptability from Penchansky and Thomas¹⁴³ and social networks, female autonomy and time availability from Rutherford et al.¹⁶⁰ Sub-themes were identified in each of these thematic categories. For both analytic procedures, the transcripts were independently read and coded by the primary researcher and two research assistants (Master’s students from Johns Hopkins) until consensus was reached.

7.4.7 Ethical considerations

Prior to engaging a research site, informal permission was sought from the *woreda* health bureau corresponding with each *kebele* site. Members from the *woreda*

health bureau organized an initial meeting with community leaders and HEWs at each site to discuss the purpose and procedure of the study. Only participants over the age of 18 were included in this study. Oral informed consent was obtained from all study participants. Caregiver names were collected from local guides for the purposes of participant selection and recruitment. All identifiers were destroyed after selection and no personal identifiers were collected over the course of the interview. No financial benefit was provided. Food and drink was provided for FGDs. IDIs were held in a caregiver's home or another site upon the request or convenience for the caregiver. All FGDs were held in private rooms in local primary schools. All research interactions were audio recorded. Recordings were transferred to password-protected laptops and erased from audio recorders upon leaving a research site. At the end of the research period, all audio recordings, transcripts and notes were transferred to the primary researcher's password-protected laptop. Ethical approval for this study was obtained from the Johns Hopkins Bloomberg School of Public Health and the Oromia Regional Health Bureau in Addis Ababa.

7.4.8 Strengths and limitations

There were a number of limitations associated with the qualitative nature of this study. In qualitative research, Lincoln and Guba address the differences between biases in quantitative studies compared to qualitative studies.¹⁷⁶ These authors present a set of four terms relevant to potential biases in qualitative research compared to their corresponding terms in quantitative research. A discussion of potential limitations and procedures to

minimize these limitations in this study will be discussed using these terms.^{††}

Credibility (internal validity) was enhanced primarily through triangulation. The objectives were explored through both IDIs and FGDs as well as from the perspective of different populations (men, women and health workers/volunteers). Data collectors were also matched with informants and participants based on gender. Data collectors underwent training in key methods for minimizing socially desirable responses, including a discussion of the purpose of the research and affiliations of the research team. Triangulation in analysis was also performed with three individuals undertaking qualitative analysis until consensus was reached on coding and procedures. From the pre-test site, the research team became aware of the potential for the HEW to select caregivers that were more likely to use the health post and have a positive relationship with the HEW. Cognizant of this possibility, selection procedures were modified to allow for the input of community leaders, local guides and members of the model families that were more likely to engage hard-to-reach populations.

Transferability (generalizability/external validity) was enhanced through obtaining “thick descriptions” of key elements of care seeking. For example, extensive narratives were obtained for care-seeking behaviors and practices from a caregiver regarding a child’s latest illness episode. Data collectors were trained in essential probes for stimulating recall and narrative progression to answer the research questions. Transferability was also enhanced by engaging multiple sites in each of the zones to reflect key characteristics of *kebeles* (geographic zones, distance to referral facility and health post utilization rates). The sample size was based on saturation and FGDs and IDIs

^{††} Corresponding terms for qualitative research according to Lincoln and Guba: internal validity → credibility; external validity → transferability; reliability → dependability; and objectivity → confirmability.¹⁷⁵

were conducted until it did not appear that new themes were emerging from different populations or across sites.

Dependability (reliability) was enhanced through the use of semi-structured guides and key probes for answering research questions. The research was designed to be flexible in order to be receptive to the emergence of unforeseen themes as well as keeping a degree of standardization necessary to obtain reliable data on research questions. Research guides went through several rounds of translation and were pre-tested with an Oromo community near Addis Ababa and an Oromo community in Jimma to ensure fidelity of translation of key concepts. Translation of transcripts was performed independently by two data collectors for each IDI and FGD so each was translated twice by data collectors to check for consistency between translations. This was performed under the guidance of the primary researcher for the first three research sites to ensure standardization of translation and agreement on English translations of key terms. Key terms were recorded in both Afan Oromo and English in transcripts. Discrepancies in translation were discussed as they arose between the team to determine consensus on meanings and a dictionary of key translations was created. Contextual information was gathered for each site in the primary researcher's field notes to account for any changes or key contextual circumstances. Data collectors also made field notes and included these into the final field notes for each research site.

Confirmability (objectivity) was enhanced through debriefing sessions within the research team and in meetings with stakeholders. Debriefing meetings were held with members of: (1) *woreda* health bureaus; (2) zonal health bureaus; (3) regional health bureaus; and (3) staff of UNICEF-Ethiopia and iCCM implementation partners. Findings

were discussed and verified with input from these individuals and institutions with a large degree of local knowledge of Afan Oromo terminology and care seeking behaviors.

There are a number of strengths associated with this study. Little research has been conducted to understand understandings of child illnesses, patterns and preferences of care seeking and the reasons underlying low rates of utilization of child health services, HEWs and iCCM services in Ethiopia. This study provides a holistic and in-depth look into caretaker perceptions, a frequently neglected viewpoint, across a range of factors potentially influencing utilization. The study is especially timely given the large investments Ethiopia is currently undertaking in child health services and the emergence of new initiatives such as iCCM and the HDA. Information on factors influencing utilization and cultural context will be an essential component to strengthening demand-generation. The study is complementary to quantitative research conducted as part of the overall evaluation of scale up of iCCM in Oromia region. The qualitative study in this thesis is paired with a quantitative assessment of care seeking and utilization of HEWs delivering iCCM services allowing the opportunity to further triangulate findings. This mixed-methods approach will further enhance validity and generalizability of research findings. The qualitative approach will be an opportunity to gain insight into research questions not currently answerable through quantitative research methods such as more in-depth exploration of why observed results are occurring. This research could act as a catalyst for more focused qualitative and quantitative research in Oromia and Ethiopia.

7.5 Quantitative study

7.5.1 Sample size and sampling procedures

The quantitative survey took place in rural *woredas* in Jimma and West Hararghe zones in Oromia region from March to July 2012. These zones were chosen because of their relatively large populations, strong presence of iCCM implementation partners and phased implementation of the iCCM program. As part of the phase-in process, rural *woredas* were randomly assigned to receive either iCCM or the routine CCM program within each zone. *Woredas* providing iCCM services were fully implementing iCCM as of July 2011.

The study was part of a cross-sectional survey carried out to determine differences in child mortality and coverage for key child health indicators in the context of iCCM scale up in the Oromo region, Ethiopia. For mortality estimation, sample size of households was calculated to detect a difference in differences of 20 percentage point in percent decline in under-five mortality between intervention and comparison areas over 18 months period with 80% power. Assuming a design effect of 1.2, an alpha of 0.05, a crude birth rate of 36 births per 1,000, and a non-response rate of 5%, 15,000 households were needed for mortality estimation in each arm of the study. The sample size for the coverage survey was determined using the indicator of treatment of acute respiratory infection (ARI) among children under-five to produce the largest sample size. Based on this indicator, 6,000 households were needed each for routine CCM and iCCM areas to measure a level of treatment of ARI among children under-five of 50% with an absolute precision of 6%. This gave a total sample of 12,000 households.

The survey used a stratified two-stage cluster sampling design with clusters represented by the 2007 census enumeration areas (EAs) and strata represented by rural *woredas*. Information for EAs was obtained from the Central Statistical Agency of Ethiopia (CSA). In the first stage of sampling, EAs within each *woreda* were selected using systematic random sampling with probability proportionate to size. Households in each selected EA were listed, and a subset of 35-36 households was randomly selected for interview using systematic random sampling. Heads of households were interviewed to obtain a list of all members of the household, and eligible women age 15-49 and primary caregivers of under-five children were identified for interview.

7.5.2 Study sample

The sample for this study consists of all under-five children residing in or having slept in a selected household on the previous night and identified as having been sick with diarrhea, fever or pneumonia in the two weeks prior to the interview. The child's primary caregiver completed the interview. A single caregiver could be interviewed for multiple children that meet this condition. Children with diarrhea or fever were identified based on the presence of those symptoms. Pneumonia was presumed and based on a series of questions identifying the presence of cough and faster than usual breathing with difficulty breathing due to problems of the child's chest.

7.5.3 Survey instruments and data collection

The survey was comprised of three modules: a household, women's and under-five questionnaire. The household questionnaire consisted of sub-modules for a household listing and demographic information, household assets and water, sanitation and malaria prevention practices. The head of household was interviewed to provide this

information. The women's questionnaire included the woman's demographic information, birth history and questions regarding antenatal, delivery and postnatal care. Women age 15-49 were interviewed for this module. The under-five survey included sub-modules on child demographic information, breastfeeding and nutrition, immunization history, vitamin A use, anthropometry measures and modules for the prevalence and practices associated with cough/fever and diarrhea. The primary caregiver (the biological mother for 97.2% of the children) was interviewed for each under-five child.

The modules and interview questionnaires were based primarily on the Demographic and Health Survey (DHS) and Multiple Indicator Cluster Survey (MICS). These modules were modified to include specific domains of interest. The main modification was the addition of a care-seeking module in the under-five questionnaire pertaining to utilization and awareness of HEW/health post services. Questionnaires were developed in English and translated into Afan Oromo and Amharic. Questionnaires were pretested among ten Afan Oromo-speaking households in a rural *kebele* approximately 20 kilometers from Addis Ababa. Several translation iterations were conducted based on feedback from the pretest and over the course of training to refine the instruments in terms of clarity of concepts and translation. The final questionnaires were piloted over two days in 20 EAs in a rural *woreda* of Oromia approximately 40 kilometers from Addis Ababa by all data collectors.

One hundred twenty data collectors who had completed high school, had experience in doing survey interviews and were fluent in English and Afan Oromo were trained for 23 days. Twenty of the highest performing data collectors were selected as supervisors to head 20 teams of one supervisor and four data collectors each. Nine teams

deployed to West Haraghe and 11 to Jimma with a list of selected EAs to be completed. Permission to conduct interviews was obtained by zonal and *woreda* health bureaus prior to data collection for each site. Logistics of the survey were contracted to a local research firm, ABH, PLC based in Addis Ababa. Each team spent approximately one day mapping an EA and one to two days conducting interviews after mapping. Informed consent was obtained for each interview. Data were collected on laptop computers using a computer assisted personal interviewing feature of Census and Survey Processing System (CSPro) software (US Census Bureau, Washington, DC). Three staff members from IIP-JHU, including the primary researcher, and two staff members from ABH were present to provide additional support and monitoring. Random quality control checks were conducted by team supervisors, ABH and IIP-JHU staff. Data was incorporated directly into a central electronic database in Addis Ababa. Validity and consistency checks were run in CSPro to check entered data. Data collection occurred for four months from February 2013 through June 2013.

7.5.4 Measures

The primary outcome was reported utilization of the HEW and/or health post by a caregiver of an under-five child sick with diarrhea, fever and/or suspected pneumonia in the two weeks preceding an interview (N = 2,248). Additional outcomes considered included utilization of the health center, a private clinic and home-based or no care. A key independent variable of interest was residence of the caregiver/child in *woreda* providing: (1) routine CCM services and (2) iCCM services. Covariates considered in this analysis were categorized into: (1) predisposing; (2) enabling; and (3) need characteristics. Table 10 provides categorizations and operational definitions of variables

used in analysis. Predisposing characteristics consisted of: religion, household size, marriage status, maternal age, maternal education, maternal literacy, previous use of health post services and child gender; enabling characteristics consisted of: zone of residence, household wealth and awareness of the availability of treatments for child illness at the health post; and need characteristics: maternal knowledge of child illness danger signs, previous experience of a child death, child age and illness type.

Categorizations were based on hypothesized relationships between independent variables and the use of the HEW at the health post for a sick child in the Andersen framework.¹⁵⁷⁻

¹⁵⁹ Distance from the nearest health facility or health post was based on reported travel time, which has been suggested as a superior measure to direct distance.^{143,177} Household wealth was grouped into wealth quintiles based on index scores constructed for each household using principal component analysis of household assets, income sources and housing characteristics).¹⁷⁸ Considering the similarities between such quintiles as suggested by Agho et al.,¹⁷⁹ the wealth quintiles were re-categorized into three groups: (i) lowest 40%, (ii) middle 40%; and (iii) upper 20%. Awareness of child health services at the health post was determined by asking caregivers the open-ended question “what services do HEWs deliver at the health post?” Responses were categorized into pre-coded options including “treating sick children.” Knowledge of child danger signs was assessed from an open-ended question “what are the illness danger signs for sick children?” Responses were categorized according to pre-coded options for nine integrated management of childhood illness (IMCI) danger signs.²⁴

Those caregivers that stated that they did not use the HEW/health post were asked the open-ended question “why did you not take the child to the health post or HEW for

treatment of this illness?” Responses were categorized into pre-coded responses based on formative research conducted prior to assess major reasons for non-utilization.

7.5.5 Model selection and data analysis

Data analysis was conducted using STATA version 13 (StataCorp, College Station, TX). Exploratory data analyses were conducted to examine the extent of missing data and dispersion of the outcome and explanatory variables. Factors associated with utilization of the HEW at the health post were examined using bivariate and multivariate logistic regression. All descriptive statistics and logistic regressions were computed using the *svy* command in STATA. This command accounted for the complex design and nested structure of the data, weighting observations by the inverse probability of selection and using the Taylor linearization procedure for computing standard errors.¹⁸⁰ Strong collinearity was found between caregiver literacy status and education and literacy status was dropped from the analysis. Caregiver marriage status was also dropped due to very low numbers of unmarried caregivers.

For multiple logistic regression, independent variables were introduced in blocks with predisposing characteristics entered first (model 1) followed by predisposing + enabling characteristics (model 2) followed by predisposing + enabling + need characteristics (model 3). To evaluate the effect of the iCCM intervention on utilization of the HEW at the health post, adjusted odds ratios (aORs) were evaluated for this independent variable of interest in each of the models accounting for potential confounders. To evaluate significant factors associated with utilizing the HEW at the health post unique to routine CCM versus iCCM *woredas*, logistic regression models using the block procedure were also run after stratifying the sample according to type of

child health services available. The relationship between predictor variables and the outcomes of interest were considered marginally significant at the $p < 0.10$ level, significant at the $p < 0.05$ level and highly significant at the $p < 0.01$ level.

Multinomial logistic regression analyses were conducted to examine factors associated with utilization of a type of source among multiple options. The outcome of interest for these analyses was choice of health care source grouped into: (1) no care/home care; (2) HEW at the health post; (3) health center; and (4) private care source. Three multinomial regression models were run using the following reference groups: (1) no care/home care; (2) HEW at the health post; and (3) private care source. This strategy generated six models of all possible comparisons between sources. In particular, multinomial logistic regression was performed to assess differences in patterns of use of these sources comparing iCCM *woredas* to routine CCM *woredas*. Independent variables that were hypothesized to impact choice among these alternatives and those that were largely exogenous to the decision were included in multinomial logistic regression models. Multinomial logistic regression results were given in adjusted relative risk ratios (aRRR).

7.5.6 Ethical considerations

The survey collected respondents' identifiers such as names and home addresses for proper control and supervision of the data quality during the survey data collection. All identifiers collected were confidentially secured and accessible only to study investigators. Data was collected directly using laptop computers. Data collectors were not allowed to share this information with anyone outside the study team. All data were uploaded remotely through a private uplink in a central computer located at ABH

headquarters in Addis Ababa and cleared from computers after uploading. Data collectors were trained in ethical procedures using the Johns Hopkins Bloomberg School of Public Health *Human Subjects Research Ethics Field Training Guide*.¹⁸¹

Oral consent was obtained from all respondents. For eligible women between the ages of 15-17 and who are unmarried, the interview team first asked for verbal consent of the parent or guardian and then asked assent of the woman before beginning the interview. No direct benefits were provided participants in this study.

Ethical approval was obtained from the Johns Hopkins Bloomberg School of Public Health and the Oromia Regional Health Bureau in Addis Ababa. Oral informed consent was obtained from all study participants.

7.5.7 Strengths and limitations

The quantitative study benefited from the randomized design and large sample sizes. The study also was sufficiently flexible so that selected questions on care seeking informed by the qualitative study such as reasons for not seeking care from the HEW at the health post could be added. The non-response rate was low (< 1%). It also rested upon a standardized questionnaire format mimicking DHS and MICS surveys which have been nationally and internationally validated. Data was collected on laptop computers through the CSPro database, eliminating potential errors in entering and cleaning data.

However, there are also a number of limitations. Self-reported symptoms were used to classify sick children and thus children may have been misclassified. However, this was followed with a series of cross-check questions about the illness potentially minimizing this possibility. Bias in recall was a potential problem in this study with caregivers being asked to remember things that happened in the past about an event that

may not have been a major event in the home. This was minimized by limiting the recall period to two weeks. Interviewer and social desirability was potentially introduced and may have impacted sensitive topics such as care seeking from informal sources or inflated rates of appropriate care seeking.

References

1. Rajaratnam JK, Marcus JR, Flaxman AD, Wang H, Levin-Rector A, Dwyer L. et al. Neonatal, postneonatal, childhood, and under-5 mortality for 187 countries, 1970-2010: a systematic analysis of progress towards Millennium Development Goal 4. *Lancet*. 2010; **375**(9730): 1988-2008.
2. Bhutta ZA, Chopra M, Axelson H, Berman P, Boerma T, Bryce J, et al. Countdown to 2015 decade report (2000-10): taking stock of maternal, newborn, and child survival. *Lancet*. 2010; **375**(9730): 2032-44.
3. United Nations Interagency Group for Child Mortality Estimation (UN-IGME). *Levels and Trends in Child Mortality: The 2013 Report*. New York: UNICEF; 2013.
4. Jones G, Steketee RW, Black RE, Bhutta ZA, Morris SS, et al. How many child deaths can we prevent this year? *Lancet*. 2003; **362**(9377): 65-71.
5. UNICEF. *State of the World's Children: 2013 Report*. New York: United Nations Children's Fund (UNICEF); 2013.
6. Victora CG, Wagstaff A, Schellenberg JA, Gwatkin D, Claeson M, Habicht JP. Applying an equity lens to child health and mortality: more of the same is not enough. *Lancet*. 2003; **362**(9379): 233-41.
7. Schellenberg JA, Victora CG, Mushi A, de Savigny D, Schellenberg D, Mshinda H, et al. Inequities among the very poor: health care for children in rural southern Tanzania. *Lancet*. 2003; **361**(9357): 561-6.
8. Victora CG, Fenn B, Bryce J, Kirkwood BR. Co-coverage of preventative interventions and implications for child-survival strategies: evidence from national surveys. *Lancet*. 2005; **366**(9495): 1460-6.

9. Boerma JT, Bryce J, Kinfu Y, Axelson H, Victora CG. Mind the gap: equity and trends in coverage of maternal, newborn, and child health services in 54 Countdown countries. *Lancet*. 2008; **371**(9620): 1259-67.
10. Van Malderen C, van Oyen H, Speybroeck N. Contributing determinants of overall and wealth-related inequality in under-5 mortality in 13 African countries. *Journal of Epidemiology and Community Health*. 2013; **67**(8): 667-76.
11. WHO. *Working Together for Health: The World Health Report, 2006*. Geneva: World Health Organization (WHO); 2006.
12. Chatterjee P. Progress patchy on health-worker crisis. *Lancet*. 2011; **377**(9764): 456.
13. Anand S, Barnighausen T. Human resources and health outcomes: cross-country econometric study. *Lancet*. 2004; **364**(9445): 1603-9.
14. Kinfu Y, dal Poz MR, Mercer H, Evans DB. The health worker shortage in Africa: are enough physicians and nurses being trained? *Bulletin of the World Health Organization*. 2009; **87**(3): 225-30.
15. Bryce J, Victora CG, Habicht JP, Black RE, Scherpbier RW. Programmatic pathways to child survival: results of a multi-country evaluation of Integrated Management of Childhood Illness. *Health Policy and Planning*. 2005; **20**(Suppl. 1): i5-17.
16. WHO. *Declaration of Alma-Ata: International Conference on Primary Health Care*. Alma-Ata: WHO; 1978.
17. Christopher JB, le May A, Lewin S, Ross DA. Thirty years after Alma-Ata: a systematic review of the impact of community health workers delivering curative interventions against malaria, pneumonia and diarrhea on child mortality and morbidity in sub-Saharan Africa. *Human Resources for Health*. 2011; **9**(1): 27.

18. Bhutta Z, Lassi ZS, Pariyo G, Huicho L. *Global Experience of Community Health Workers for Delivery of Health Related Millennium Development Goals: A Systematic Review*. Geneva: Global Health Workforce Alliance, WHO; 2010.
19. Lehmann U, Sanders D. *Community Health Workers: What do We Know About Them? The State of the Evidence on Programs, Activities, Costs and Impact on Health Outcomes of Using Community Health Workers*. Geneva: WHO; 2007.
20. Haines A, Sanders D, Lehmann U, Rowe AK, Lawn JE, Jan S, et al. Achieving child survival goals: potential contribution of community health workers. *Lancet*. 2007; **369**(9579): 2121-31.
21. Lewin S, Munabi-Babigumira S, Glenton C, Daniels K, Bosch-Capblanch X, van Wyk BE, et al. Lay health workers in primary and community health care for maternal and child health and the management of infectious diseases. *Cochrane Database of Systematic Reviews*. 2010; (3): CD004015.
22. Das JK, Lassi ZS, Salam RA, Bhutta ZA. Effect of community based interventions on childhood diarrhea and pneumonia: uptake of treatment modalities and impact on mortality. *BMC Public Health*. 2013; **13**(Suppl. 3): S29.
23. Waters H. *The Costing of Community Maternal and Child Health Interventions: A Review of the Literature with Applications for Conducting Cost-Effectiveness Studies and for Advocacy*. New York: Interagency Working Group on Integrated Management of Child Illness (IMCI), UNICEF; 2000.
24. CORE Group, Save the Children, BASICS, MCHIP. (2010). *Community Case Management Essentials: Treating Common Childhood Illnesses in the Community*. A

Guide for Program Managers. Washington, DC: CORE Group, Save the Children, BASICS, MCHIP; 2010.

25. Winch PJ, Leban K, Casazza L, Walker L, Percy K. An implementation framework for household and community integrated management of childhood illness. *Health Policy and Planning*. 2002; **17**(4): 345-53.

26. George A, Young M, Nefdt R, Basu R, Sylla M, Clarysse et al. Community health workers providing government community case management for child survival in sub-Saharan Africa: who are they and what are they expected to do. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 85-91.

27. WHO, UNICEF. *Integrated Management of Childhood Illness: Caring for Newborns and Children in the Community. Manual for the Community Health Worker*. Geneva, New York: WHO, UNICEF; 2011.

28. WHO, UNICEF. *Joint Statement: Clinical management of acute diarrhea*. Geneva. New York: WHO, UNICEF; 2004.

29. UNICEF. *Malaria and Children: Progress in Intervention Coverage*. New York: UNICEF; 2007.

30. WHO, UNICEF. *WHO and UNICEF Joint Statement: Management of Pneumonia in Community Settings*. Geneva, New York: WHO, UNICEF; 2004.

31. WHO, UNICEF. *Joint Statement on the Community-based Management of Severe Acute Malnutrition*. Geneva. New York: WHO, UNICEF; 2007.

32. George A, Young M, Nefdt R, Basu R, Sylla M, Bannicq MY, et al. Community Case Management of Diarrhea, Malaria and Pneumonia: Tracking Science to Policy and Practice in Sub-Saharan Africa. New York: UNICEF; 2012.

33. Ghebreyesus TA, Witten KH, Getachew A, O'Neill K, Bosman A, Teklehaimanot A. Community-based malaria control in Tigray, northern Ethiopia. *Parassitologia*. 1999; **41**(1-3): 367-71.
34. Dawson P, Pradhan Y, Houston R, Karki S, Poudel D, Hodgins S. From research to national expansion: 20 years' experience of community-based management of childhood pneumonia in Nepal. *Bulletin of the World Health Organization*. 2008; **86**(5): 339-43.
35. Sazawal S, Black RE. Meta-analysis of intervention trials on case-management of pneumonia in community settings. *Lancet*. 1992; **340**(8818): 528-33.
36. Baqui AH, Arifeen SE, Williams EK, Ahmed S, Mannan I, Rahman SM, et al. Effectiveness of home-based management of newborn infections by community health workers in rural Bangladesh. *Pediatric Infectious Disease Journal*. 2009; **28**(4): 304-10.
37. Kidane G, Morrow RH. Teaching mothers to provide home treatment of malaria in Tigray, Ethiopia: a randomized trial. *Lancet*. 2000; **356**(9229): 550-5.
38. Sazawal S, Black RE. Effect of pneumonia case management on mortality in neonates, infants, and preschool children: a meta-analysis of community-based trials. *Lancet Infectious Disease*. 2003; **3**(9): 547-56.
39. Collins S. *Community-Based Therapeutic Care: A New Paradigm for Selective Feeding in Nutritional Crises*. London: Humanitarian Practice Network (HPN), Overseas Development Institute (ODI); 2004.
40. Wang'ombe JK. Economic evaluation in primary health care: the case of Western Kenya community based health care project. *Social Science and Medicine*. 1984; **18**(5): 375-85.

41. Borghi J, Thapa B, Osrin D, Jan S, Morrison J, Tamang S, et al. Economic assessment of a women's group intervention to improve birth outcomes in rural Nepal. *Lancet*. 2005; **366**(9500): 1882-4.
42. Maman B. *An Economic Analysis of Community Health Worker Programmes in the Western Cape Province*. Durban: HealthSystems Trust; 1997.
43. Winch PJ, Gilroy KE, Wolfheim C, Starbuck ES, Young MW, Walker LD, et al. Intervention models for the management of children with signs of pneumonia or malaria by community health workers. *Health Policy and Planning*. 2005; **20**(4): 199-212.
44. Marsh DR, Gilroy KE, van de Weerd R, Wansi E, Qazi S. Community case management of pneumonia: at a tipping point? *Bulletin of the World Health Organization*. 2008; **86**(5): 381-9.
45. Briggs CJ, Garner P. Strategies for integrating primary health services in middle- and low-income countries at the point of delivery. *Cochrane Database of Systematic Reviews*. 2006; (2): CD003318.
46. Kallander K, Nsungwa-Sabiiti J, Peterson S. Symptom overlap for malaria and pneumonia--policy implications for home management strategies. *Acta Tropica*. 2004; **90**(2): 211-4.
47. Pandey MR, Sharma PR, Gubhaju BB, Shakya GM, Neupane RP, Gautam A, et al. Impact of a pilot acute respiratory infection (ARI) control programme in a rural community of the hill region of Nepal. *Annals of Tropical Paediatrics*. 1989; **9**(4): 212-20.
48. Marsh DR, Hamer DH, Pagnoni F, Peterson S. Introduction to a special supplement: evidence for the implementation, effects, and impact of the integrated community case

- management strategy to treat childhood infection. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 2-5.
49. Delacollete C, van der Stuyt P, Molima K. Using community health workers for malaria control: experience in Zaire. *Bulletin of the World Health Organization*. 1996; **74**(4): 423-30.
50. Oxford Policy Management. *Lady Health Worker Programme: External Evaluation of the National Programme for Family Planning and Primary Health Care, Quantitative Survey Report*. Oxford: Oxford Policy Management; 2002.
51. Greenwood BM, Bradley AK, Byass P, Greenwood AM, Menon A, Snow RW, et al. Evaluation of a primary health care programme in The Gambia. II. Its impact on mortality and morbidity in young children. *Journal of Tropical Medicine and Hygiene*. 1990; **93**(2): 87-97.
52. Kelly JM, Osamba B, Garg RM, Hamel MJ, Lewis JJ, Rowe SY, et al. Community health worker performance in the management of multiple childhood illnesses: Siaya District, Kenya, 1997-2001. *American Journal of Public Health*. 2001; **91**(10): 1617-24.
53. Yeboah-Antwi K, Pilingana P, MacLeod WB, Semrau K, Siazeele K, Kalesha P, et al., Community case management of fever due to malaria and pneumonia in children under five in Zambia: a cluster randomized controlled trial. *PLoS Medicine*. 2010; **7**(9): e1000340.
54. Gyapong MG, Garshong B. *Lessons Learned in Home Management of Malaria: Implementation Research in Four African Countries*. Geneva: WHO; 2007.
55. Degefie T, Marsh D, Gebremariam A, Tefera W, Osborn G, Waltensperger K. Community case management improves use of treatment for childhood diarrhea, malaria

- and pneumonia in a remote district of Ethiopia. *Ethiopian Journal of Health Development*. 2009; **23**(1): 120-6.
56. Kalyango JN, Lindstrand A, Rutebemberwa E, Ssali S, Kadobera D, Karamagi C, et al. Increased use of community medicine distributors and rational use of drugs in children less than fever years of age in Uganda caused by integrated community case management of fever. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 36-45.
57. Curtale F, Siwakoti B, Lagrosa C, LaRaja M, Guerra R. Improving skills and utilization of community health volunteers in Nepal. *Social Science and Medicine*. 1995; **40**(8): 1117-25.
58. Rutebemberwa E, Kadobera D, Katureebe S, Kalyango JN, Mworozzi E, Pariyo G. Use of community health workers for management of malaria and pneumonia in urban and rural areas in eastern Uganda. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 30-5.
59. Ghimire M, Pradhan YV, Maskey MK. Community-based interventions for diarrheal diseases and acute respiratory infections in Nepal. *Bulletin of the World Health Organization*. 2010; **88**(3): 216-21.
60. Chinbuah MA, Kager PA, Abbey M, Gyapong M, Awini E, Nonvignon J, et al. Impact of community management of fever (using antimalarials with or without antibiotics) on childhood mortality: a cluster-randomized controlled trial in Ghana. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 11-20.

61. Hamer DH, Marsh DR, Peterson S, Pagnoni F. Integrated community case management: next steps in addressing the implementation research agenda. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 151-3.
62. Peterson S. Assessing the scale-up of child survival interventions. *Lancet*. 2010; **375**(9714): 530-1.
63. Harford Web Publishing. *The History of the Federal Democratic Republic of Ethiopia: World History Archives*; 2012. Available from: <http://www.hartford-hwp.com/>. Accessed on June 16, 2012.
64. World Bank. *World Development Indicators*. Washington, DC: Development Data Group, World Bank; 2013.
65. Ethiopia Ministry of Finance and Economic Development. *Ethiopia's Progress Towards Eradicating Poverty: An Interim Report on Poverty Analysis Study (2010/11)*. Addis Ababa: Development Planning and Research Directorate; 2012.
66. United Nations Development Program (UNDP). *Human Development Report 2013--The Rise of the South: Human Progress in a Diverse World*. New York: UNDP; 2013.
67. WHO, UNICEF. *Countdown to 2015: Accountability for Maternal, Newborn and Child Survival*. Geneva, New York: WHO, UNICEF; 2013.
68. Central Statistical Agency [Ethiopia], ORC Macro. *Ethiopia Demographic and Health Survey 2011*. Addis Ababa, Calverton: Central Statistical Agency [Ethiopia], ORC Macro; 2012.
69. UNICEF. *Committing to Child Survival: A Promise Renewed Progress Report 2013*. New York: UNICEF; 2013.

70. Federal Democratic Republic of Ethiopia Population Census Commission. *Summary and Statistical Report of the 2007 Population and Housing Census*. Addis Abbaba: Central Statistical Agency; 2012.
71. Adugna A. *Ethiopian Demography and Health—Oromia*. Accessed 12 June 2012; 2010. Available from: <http://www.ethiodemographyandhealth.org/Oromia.html>.
72. Oromia Regional Health Bureau (ORB). Health Sector Five year Plan (HSDP IV). Finfanne: ORHB; 2010.
73. Health Extension and Education Center. *Health Extension Program in Ethiopia: Profile*. Addis Ababa: Health Extension and Education Center; 2007.
74. Bilal NK, Herbst CH, Zhao F, Soucat A, Lemiere C. Health extension workers in Ethiopia: improved access and coverage for the rural poor. In P. Chuhan-Pole, M. Angwafo (Eds.), *Yes Africa Can: Success Stories from a Dynamic Continent* (pp. 433-44). Washington, DC: World Bank; 2011.
75. Admasu K. The implementation of the health Development Army: challenges, perspectives and lessons learned with a focus on Tigray's experience. *Policy and Practice, Federal Ministry of Health, Addis Ababa*. 2013; **5**(1): 3-7.
76. Center for National Health Development in Ethiopia. *Ethiopia Health Extension Program Evaluation Study, 2005-2007, Volume 1. Household Health Survey*. Addis Ababa: Center for National Health Development in Ethiopia; 2008.
77. Yitayal M, Berhane Y, Worku A, Kebede Y. Health extension program factors, frequency of household visits and being model households, improved utilization of basic health services in Ethiopia. *BMC Health Services Research*. 2014; **14**(1): 156.

78. Murray J, Adeyi GN, Graeff J, Fields R, Rasmuson M, Salgado R, et al. *Emphasis Behaviors in Maternal and Child Health: Focusing on Caretaker Behaviors to Develop Maternal and Child Health Programs in Communities*. Arlington: BASICS; 1997.
79. Young A. An anthropological perspective on medical knowledge. *Journal of Medicine and Philosophy*. 1980; **5**(2): 102-16.
80. Kleinman A. *Patients and Healers in the Context of Culture*. Berkeley: University of California Press; 1980.
81. Pelto PJ, Pelto GH. Studying knowledge, culture and behavior in applied medical anthropology. *Medical Anthropology Quarterly*. 1997; **11**(2): 147-63.
82. Colvin CJ, Smith HJ, Swartz A, Ahs JW, de Heer J, Opiyo N, et al. Understanding careseeking for child illness in sub-Saharan Africa: A systematic review and conceptual framework based on qualitative research of household recognition and response to child diarrhea, pneumonia and malaria. *Social Science and Medicine*. 2013; **86**(1): 68-78.
83. Comoro C, Nsimba SE, Warsame M, Tomson G. Local understanding, perceptions and reported practices of mothers/guardians and health workers on childhood malaria in a Tanzanian district: implications for malaria control. *Acta Tropica*. 2003; **87**(3): 305-13.
84. Hildenwall H, Rutebemberwa E, Nsabagasani X, Pariyo G, Tomson G, Peterson S. Local illness concepts: implications for management of childhood pneumonia in eastern Uganda. *Acta Tropica*. 2007; **101**(3): 217-24.
85. Beiersmann C, Sanou A, Wladarsch E, de Allegri M, Kouyaté B, & Müller O. Malaria in rural Burkina Faso: local illness concepts, patterns of traditional treatment and influence on health-seeking behavior. *Malaria Journal*. 2007; **6**: 106.

86. Ellis AA, Winch P, Daou Z, Gilroy KE, Swedberg E. Home management of childhood diarrhea in southern Mali: implications for the introduction of zinc treatment. *Social Science and Medicine*. 2007; **64**(3): 701-12.
87. Adongo PB, Kirkwood B, Kendall C. How local community knowledge about malaria affects insecticide-treated net use in northern Ghana. *Tropical Medicine and International Health*. 2005; **10**(4): 366-78.
88. Opiyo P, Mukabana WR, Kiche I, Mathenge E, Killeen GF, Fillinger U. An exploratory study of community factors relevant for participatory malaria control on Rusinga Island, western Kenya. *Malaria Journal*. 2007; **6**: 48.
89. Ofovwe GE, Ibadin OM, Ofovwe EC, Okolo AA. Home management of febrile convulsion in an African population: a comparison of urban and rural mothers' knowledge attitude and practice. *Journal of the Neurological Sciences*. 2002; **200**(1-2): 49-52.
90. Kauchali S, Rollins N, van den Broeck J. Local beliefs about childhood diarrhoea: importance for healthcare and research. *Journal of Tropical Pediatrics*. 2004; **50**(2): 82-9.
91. Chibwana AI, Mathanga DP, Chinkhumba J, Campbell Jr. CH. Socio-cultural predictors of health-seeking behavior for febrile under-five children in Mwanza-Neno district, Malawi. *Malaria Journal*. 2009; **8**: 219.
92. Eriksen J, Nsimba SE, Minzi OM, Sanga AJ, Petzold M, Gustafsson LL, et al. Adoption of the new antimalarial drug policy in Tanzania: a cross-sectional study in the community. *Tropical Medicine and International Health*. 2005; **10**(10): 1038-46.

93. Mogenson HO. False teeth and real suffering: the social course of 'germectomy' in eastern Uganda. *Culture, Medicine and Psychiatry*. 2000; **24**(3): 331-51.
94. De Savigny D, Mayombana C, Mwageni E, Masanja H, Minhaj A, Mkilindi Y, et al. Care-seeking patterns for fatal malaria in Tanzania. *Malaria Journal*. 2004; **3**: 27.
95. Warsame M, Kimbute O, Machinda Z, Ruddy P, Melkisedick M, Peto T, Ribeiro I, et al. Recognition, perceptions and treatment practices for severe malaria in rural Tanzania: implications for accessing rectal artesunate as a pre-referral. *PLoS One*. 2007; **2**(1): e149.
96. Hausmann-Muela S, Ribera JM. Recipe knowledge: a tool for understanding some apparently irrational behavior. *Anthropology and Medicine*. 2003; **10**(1): 87-103.
97. Winch PJ, Doumbia S, Kanté M, Malé AD, Swedberg E, Gilroy KE., et al. Differential community response to introduction of zinc for childhood diarrhoea and combination therapy for malaria in southern Mali. *Journal of Nutrition*. 2008; **138**(3): 642-5.
98. Irimu G, Nduati RW, Wafula E, Lenja J. Community understanding of pneumonia in Kenya. *African Health Sciences*. 2008; **8**(2): 103-7.
99. Iyun BF, Oke EA. Ecological and cultural barriers to treatment of childhood diarrhoea in riverine areas of Ondo State, Nigeria. *Social Science and Medicine*. 2000; **50**(7-8): 953-64.
100. Mbachu CO, Onwujekwe OE, Uzochukwu BS, Uchegbu E, Oranuba J, Ilika AL. Examining equity in access to long-lasting insecticide nets and artemisinin-based combination therapy in Anambra State, Nigeria. *BMC Public Health*. 2012; **12**: 315.
101. Makemba AM, Winch PJ, Makame VM, Mehl GL, Premji Z, Minjas JN, et al. Treatment practices for degedege, a locally recognized febrile illness, and implications

for strategies to decrease mortality from severe malaria in Bagamoyo District, Tanzania.

Tropical Medicine and International Health. 1996; **1**(3): 305-13.

102. Omotade OO, Adeyemo AA, Kayode CM, Oladepo O. Treatment of childhood diarrhoea in Nigeria: need for adaptation of health policy and programmes to cultural norms. *Journal of Health, Population and Nutrition*. 2000; **18**(3): 39-44.

103. Kengeya-Kayondo JF, Seeley JA, Kajura-Bajenja E, Kabunga E, Mubiru E, Sembajja F, et al. Recognition, treatment seeking behaviour and perception of cause of malaria among rural women in Uganda. *Acta Tropica*. 1994; **58**(3-4): 267-73.

104. Okeke TA. Improving malaria recognition, treatment and referral practices by training caretakers in rural Nigeria. *Journal of Biosocial Science*. 2010; **42**(3): 325-39.

105. Cosminsky S, Mhloyi M, Ewbank D. Child feeding practices in a rural area of Zimbabwe. *Social Science and Medicine*. 1993; **36**(7): 937-47.

106. Chuma J, Gilson L, Molyneux C. Treatment-seeking behaviour, cost burdens and coping strategies among rural and urban households in Coastal Kenya: an equity analysis. *Tropical Medicine and International Health*. 2007; **12**(5): 673-86.

107. Nwokocha EE, Awomoyi AO. Factors influencing mothers' role in convulsion treatment among under-five children in Ibadan, Nigeria. *World Health and Population*. 2009; **11**(2): 15-29.

108. Janzen JM. *The Quest for Therapy: Medical Pluralism in Lower Zaire*. Berkeley: University of California Press; 1978.

109. Leach MA, Fairhead JR, Millimouno D, Diallo AA. New therapeutic landscapes in Africa: Parental categories and practices in seeking infant health in the Republic of Guinea. *Social Science and Medicine*. 2008; **66**(10): 2157-67.

110. Scrimshaw S, Hurtado E. *Rapid Assessment Procedures for Nutrition and Primary Health Care: Anthropological Approaches to Improving Program Effectiveness*. Tokyo: United Nations University; 1987.
111. Whyte SR. *Questioning Misfortune. The Pragmatics of Uncertainty in Eastern Uganda*. Cambridge: Cambridge University Press; 1997.
112. Ryan GW. What do sequential behavioral patterns suggest about the medical decision-making process?: Modeling home case management of acute illnesses in a rural Cameroonian village. *Social Science and Medicine*. 1998; **46**(2): 209-25.
113. Young JC. *Medical Choice in a Mexican Village*. New Brunswick: Rutgers University Press; 1981.
114. Snow RW, Mung'ala VO, Forster D, Marsh K. The Role of the District Hospital in Child Survival at the Kenyan Coast. *African Journal of Health Sciences*. 1994; **1**: 71-5.
115. Garro L. On the rationality of decision-making studies: Part 1: Decision models of treatment choice. *Medical Anthropology Quarterly*. 1998; **12**(3): 319-40.
116. Parkhurst JO, Ssengooba F. Assessing access barriers to maternal healthcare: measuring bypassing to identify health center needs in rural Uganda. *Health Policy and Planning*. 2009; **24**(5): 377-84.
117. Tolhurst R, Amekudzi YP, Nyonator FK, Bertel Squire S, Theobald S. "He will ask why the child gets sick so often": the gendered dynamics of intrahousehold bargaining over healthcare for children with fever in the Volta Region of Ghana. *Social Science and Medicine*. 2008; **66**(5): 1106-17.

118. Tolhurst R, Nyongato FK. Looking within the household: gender roles and responses to malaria in Ghana. *Transactions of the Royal Society of Tropical Medicine and Hygiene*. 2006; **100**(4): 321-6.
119. Amuyunzu M. Willing the spirits to reveal themselves: rural Kenyan mothers' responsibility to restore their children's health. *Medical Anthropology Quarterly*. 1998; **12**(4): 490-502.
120. Kallander K, Tomson G, Nsabagasani X, Sabiti JN, Pariyo G, Peterson S. Can community health workers and caretakers recognise pneumonia in children? Experiences from western Uganda. *Transactions of the Royal Society of Tropical Medicine and Hygiene*. 2006; **100**(10): 956-63.
121. Kamat VR, Nyato DJ. Community response to artemisinin-based combination therapy for childhood malaria: a case study from Dar es Salaam, Tanzania. *Malaria Journal*. 2010; **9**: 1-9.
122. Nyamongo IK. Health care switching behaviour of malaria patients in a Kenyan rural community. *Social Science and Medicine*. 2002; **54**(3): 377-86.
123. Ellis AA, Doumbia S, Traoré S, Dalglish SL, Winch PJ. Household roles and care-seeking behaviours in response to severe childhood illness in Mali. *Journal of Biosocial Science*. 2013; **45**(6): 743-59.
124. Van der Geest S. Overcoming ethnocentrism: how social science and medicine relate and should relate to one another. *Social Science and Medicine*. 1995; **40**(7): 869-72.

125. Friend-du Preez N, Cameron N, Griffiths P. Stuips, sputs and prophet ropes: the treatment of abantu childhood illnesses in urban South Africa. *Social Science and Medicine*. 2009; **68**(2): 343-51.
126. Van der Geest S. Pharmaceuticals in the Third World: the local perspective. *Social Science and Medicine*. 1987; **25**(3): 273-6.
127. Reeler AV. Anthropological perspectives on injections: a review. *Bulletin of the World Health Organization*. 2000; **78**(1): 135-43.
128. Nichter M. Social Science lessons from diarrhea research and their application to ARI. *Human Organization*. 1993; **52**(1): 53-67.
129. Rutebemberwa E, Nsabagasani X, Pariyo G, Tomson G, Peterson S, Kallander K. (2009). Use of drugs, perceived drug efficacy and preferred providers for febrile children: implications for home management of fever. *Malaria Journal*. 2009; **8**: 131.
130. Buor D. Analyzing the primacy of distance in the utilization of health services in the Ahafo-Ano South district, Ghana. *International Journal of Health Planning and Management*. 2003; **18**(4): 293-311.
131. Rutebemberwa E, Kallander K, Tomson G, Pariyo G. Determinants of delay in care-seeking for febrile children in eastern Uganda. *Tropical Medicine and International Health*. 2009; **14**(4): 472-9.
132. Sasaki S, Fujino Y, Igarashi K, Tanabe N, Muleya CM, Suzuki H. Access to a health facility and care-seeking for danger signs in children: before and after a community-based intervention in Lusaka, Zambia. *Tropical Medicine and International Health*. 2010; **15**(3): 312-20.

133. Addai I. Determinants of use of maternal-child health services in rural Ghana. *Journal of Biosocial Science*. 2000; **32**(1): 1-15.
134. Gyimah SO, Takyi BK, Addai I. Challenges to the reproductive-health needs of African women: on religion and maternal health utilization in Ghana. *Social Science and Medicine*. 2006; **62**(12): 2930-44.
135. Doku D, Neupane S, Doku PN. 2012. Factors associated with reproductive health care utilization among Ghanaian women. *BMC International Health and Human Rights*. 2012; **12**: 29.
136. Mukiira C, Ibisomi L. Health care seeking practices of caregivers of children under 5 with diarrhea in two informal settlements in Nairobi, Kenya. *Journal of Child Health Care*. 2013; [Epub ahead of print].
137. Orem JN, Mugisha F, Okui AP, Musango L, Kirigia JM. Health care seeking patterns and determinants of out-of-pocket expenditure for Malaria for the children under-five in Uganda. *Malaria Journal*. 2013; **12**: 175.
138. Magadi M, Madise N, Rodrigues R. Frequency and timing of antenatal care in Kenya: explaining variation between women of different communities. *Social Science and Medicine*. 2000; **51**(4): 551-61.
139. Taffa N, Chepngeno G. Determinants of health care seeking for childhood illnesses in Nairobi slums. *Tropical Medicine and International Health*. 2005; **10**(3): 240-5.
140. Gage A. Barriers to the utilization of maternal health care in rural Mali. *Social Science and Medicine*. 2007; **65**(8): 1666-82.
141. Diaz T, George AS, Rao SR, Bangura PS, Baimba JB, McMahon SA, et al. Healthcare seeking for diarrhea, malaria and pneumonia among children in four poor

- rural districts in Sierra Leone in the context of free health care: results of a cross-sectional survey. *BMC Public Health*. 2013; **13**: 157.
142. Thaddeus S, Maine D. Too far to walk: maternal mortality in context. *Social Science and Medicine*. 1994; **38**(8): 1091–110.
143. Rutherford ME, Mulholland K, Hill PC. How access to health care relates to under-five mortality in sub-Saharan Africa: systematic review. *Tropical Medicine and International Health*. 2010; **15**(5): 508-19.
144. Hjortsberg C, Mwikisa C. Cost of access to health services in Zambia. *Health Policy and Planning*. 2002; **17**(1): 71-7.
145. Njau JD, Goodman C, Kachur SP, Palmer N, Khatib RA, Abdulla A, et al. Fever treatment and household wealth: the challenge posed for rolling out combination therapy for malaria. *Tropical Medicine and International Health*. 2006; **11**(3): 299–313.
146. Assefa T, Belachew T, Tegegn A. Mothers' health care seeking behavior for childhood illnesses in Derra District, Northshoa Zone, Oromia Regional State, Ethiopia. *Ethiopian Journal of Health Sciences*. 2008; **18**(3): 87-94.
147. Fantahun M, Degu G. Health service utilization in Amhara region of Ethiopia. *Ethiopian Journal of Health Development*. 2003; **17**(2): 141-7.
148. Fasil T, Makonnen A, Fekadu A. Mothers' health services utilization and health care seeking behavior during infant rearing: West Ethiopia. *Ethiopian Journal of Health Development*. 2002; **16**(Special Issue): 51-8.
149. Sauerborn R, Nougara A, Diesfeld HJ. Low utilization of community health workers: results from a household interview survey in Burkina Faso. *Social Science and Medicine*. 1989; **29**(10): 1163-74.

150. Garg R, Omwomo W, Witte JM, Lee LA, Deming MS. Care seeking during fatal childhood illnesses: Siaya District, Kenya, 1998. *American Journal of Public Health*. 2001; **91**(10): 1611-3.
151. Sauerborn R, Nougara A, Latimer E. The elasticity of demand for health care in Burkina Faso: differences across age and income groups. *Health Policy and Planning*. 1994; **9**(2): 186-92.
152. Ghebreyesus TA, Witten KH, Getachew A, Yohannes AM, Tesfay W, Minass M, et al. The community-based malaria control program in Tigray, northern Ethiopia. A review of program set-up, activities, outcomes and impact. *Parassitologia*. 2000; **42**(3-4): 255-90.
153. Nsungwa-Sabiiti J, Peterson S, Pariyo G, Ogwal-Okeng J, Petzold MG, Tomson G. Home-based management of fever and malaria treatment practices in Uganda. *Transactions of the Royal Society of Tropical Medicine and Hygiene*. 2007; **101**(12): 1199-207.
154. Kisia J, Nelima F, Otieno DO, Kiilu K, Emmanuel W, Sohani S, et al. Factors associated with utilization of community health workers in improving access to malaria treatment among children in Kenya. *Malaria Journal*. 2012; **11**: 248.
155. Victora CG, Vaughan JP, Barros FC, Silva AC, Tomasi E. Explaining trends in inequities: evidence from Brazilian child health studies. *Lancet*. 2000; **356**(9235): 1093-8.
156. Mukanga D, Tibenderana JK, Peterson S, Pariyo GW, Kiguli J, Waiswa P, et al. Access, acceptability and utilization of community health workers using diagnostics for

- case management of fever in Ugandan children: a cross-sectional study. *Malaria Journal*. 2012; **11**: 121.
157. Andersen RM, Newman JF. Social and individual determinants of medical care utilization in the United States. *Milbank Memorial Quarterly*. 1973; **51**(1): 95-124.
158. Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? *Journal of Health and Social Behavior*. 1995; **36**(1): 1-10.
159. Kroeger A. Anthropological and sociomedical health care research in developing countries. *Social Science and Medicine*. 1983; **17**(3): 47–161.
160. Penchansky R, Thomas J. The concept of access: definition and relationship to consumer satisfaction. *Medical Care*. 1981; **19**(2): 127-40.
161. O'Donnell O. 2007. Access to health care in developing countries: breaking down demand side barriers. *Cadernos de Saúde Pública*. 2007; **23**(12): 2820-34.
162. Ensor T, Cooper S. Overcoming barriers to health service access: influencing the demand side. *Health Policy and Planning*. 2004; **19**(2): 69-79.
163. Peters DH, Garg A, Bloom G, Walker DG, Brieger WR, Rahman MH. Poverty and access to health care in developing countries. *Annals of the New York Academy of Sciences*. 2008; **1136**: 161-71.
164. Yitayal M, Berhane Y, Worku A, Kebede Y. Health extension program factors, frequency of household visits and being model households, improved utilization of basic health services in Ethiopia. *BMC Health Services Research*. 2014; **14**(1): 156.
165. Mela Research, PLC. *Baseline Coverage Survey for the Independent Prospective Evaluation of the Integrated Community Case Management (ICCM) in Oromia Region, Ethiopia: Draft Report*. Addis Ababa: Mela Research, PLC; 2011.

166. The Last Ten Kilometers Project (L10K). *Changes in Maternal, Newborn and Child Health in 115 Rural Woredas of Amhara, Oromia, SNNP and Tigray Regions of Ethiopia, 2008-2010: Findings from the L10K baseline and midterm surveys*. Addis Ababa: John Snow International (JSI) Research and Training Institute, Inc.; 2012.
167. Miller N. *Integrated Community Case Management of Childhood Illness in Ethiopia: Implementation Strength and Quality of Care*. Dissertation Report. Baltimore: Johns Hopkins University; 2013.
168. Deressa W. Treatment-seeking behavior for febrile illness in an area of seasonal malaria transmission rural Ethiopia. *Malaria Journal*. 2007; **6**(1): 49.
169. Deressa W, Ali A, Berhane Y. Household and socioeconomic factors associated with childhood febrile illnesses and treatment seeking behavior in an area of epidemic malaria in rural Ethiopia. *Transactions of the Royal Society of Tropical Medicine and Hygiene*. 2007; **101**(9), 939-47.
170. Garro LC, Mattingly C. Narrative as construct and construction. In Garro LC, Mattingly C, eds., *Narrative and the Cultural Construction of Illness and Healing*. Oakland: University of California Press, 1-49; 2000.
171. Creswell JW. *Qualitative Inquiry and Research Design: Choosing among Five Approaches*. Thousand Oaks: Sage Publications; 2007.
172. Krueger RA, Casey MA. *Focus Groups: A Practical Guide for Applied Research*. 3rd ed. Thousand Oaks: Sage Publications; 2000.
173. Guest G, Bunce A, Johnson L. How many interviews are enough? An experiment with data saturation and variability. *Field Methods*. 2006; **18**(1): 59-82.

174. Morse JM. The significance of saturation. *Qualitative Health Research*. 1995; **5**(2): 147-49.
175. Charmaz K. *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*. Thousand Oaks: Sage Publications; 2006.
176. Lincoln Y, Guba E. But is it rigorous? Trustworthiness and authenticity in naturalistic evaluation. In W. Shadish, C. Reichardt (Eds.), *Evaluation Studies Review Annual*, 12th Ed. (Pp. 425-36). Newbury Park: Sage Publications; 1987.
177. Noor A, Amin A, Gething P, Atkinson PM, Hay SI, Snow RW. Modelling distances travelled to government health services in Kenya. *Tropical Medicine and International Health*. 2006; **11**(2): 188-96.
178. Filmer D, Pritchett L. Estimating wealth effects without expenditure data - or tearsan application to educational enrollments in states of India. *Demography*. 2001; **38**(1): 85-120.
179. Agho KE, Dibley MJ, Odiase JI, Ogbonmwan SM. Determinants of exclusive breastfeeding in Nigeria. *BMC Pregnancy and Childbirth*. 2011; **11**: 2.
180. Cochran WG. *Sampling Techniques*. 3rd ed. New York: Wiley; 1977.
181. Johns Hopkins Bloomberg School of Public Health (JHSPH). *JHSPH Human Subjects Research Ethics Field Training Guide*. Baltimore: JHSPH; 2010.

Table 1: Key child health indicators in Ethiopia

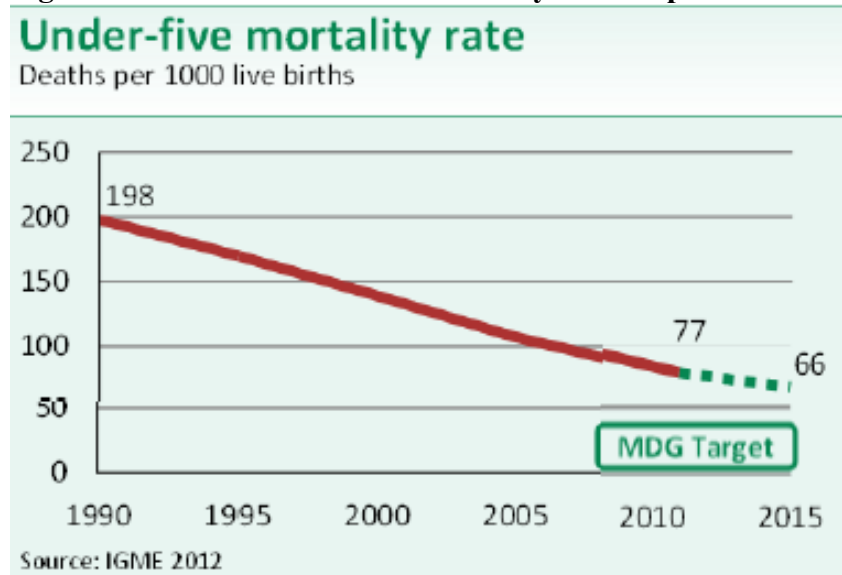
Indicator	Rate/%	Year	Source
Under-five mortality rate	106/1,000 live births	2010	Countdown to 2015
	88/1,000 live births	2011	EDHS
Infant mortality rate	68/1,000 live births	2010	Countdown to 2015
	59/1,000 live births	2011	EDHS
Neonatal mortality rate	35/1,000 live births	2008	Countdown to 2015
	37/1,000 live births	2011	EDHS
Measles vaccination coverage	56%	2011	EDHS
DPT3 coverage	37%	2011	EDHS
Vitamin A supplementation (6-59 months, previous 6 months)	53%	2011	EDHS
Stunting (< -2 s.d.)	44%	2011	EDHS
Wasting (< -2 s.d.)	10%	2011	EDHS
Severe Acute Malnutrition (<3s.d.)	3%	2011	EDHS
Fever in previous 2 weeks	17%	2011	EDHS
Under-fives with fever who took antimalarial	4%	2011	EDHS
Under-fives with diarrhea in previous 2 weeks	13%	2011	EDHS
Under-fives with diarrhea who took ORT	31%	2011	EDHS
Under-fives with ARI ^a in previous 2 weeks	7%	2011	EDHS
Under-fives with ARI who took antibiotic	7%	2011	EDHS

^a Acute respiratory infection

Sources: WHO, UNICEF. *Countdown to 2015: Accountability for Maternal, Newborn and Child Survival*. Geneva, New York: WHO, UNICEF; 2013.

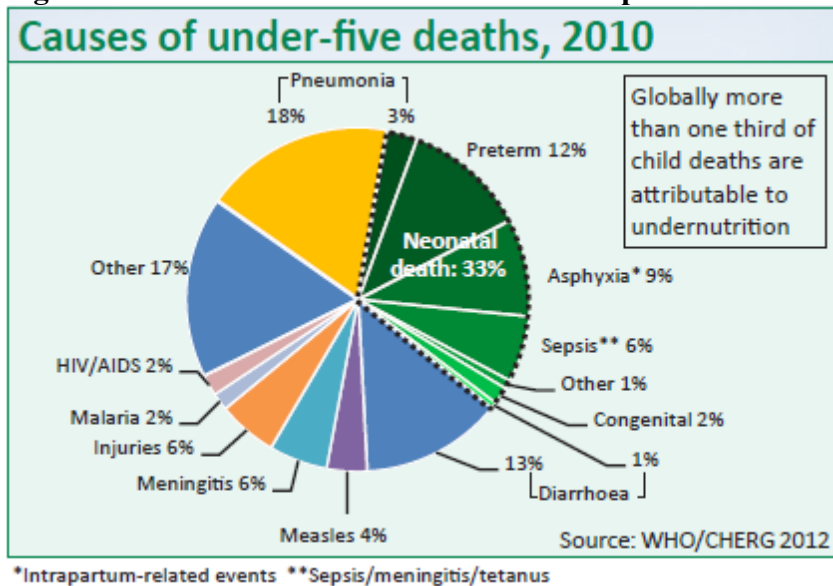
Central Statistical Agency [Ethiopia], ORC Macro. *Ethiopia Demographic and Health Survey (EDHS) 2011*. Addis Ababa, Calverton: Central Statistical Agency [Ethiopia], ORC Macro; 2012.

Figure 1: Trend in under-five mortality in Ethiopia



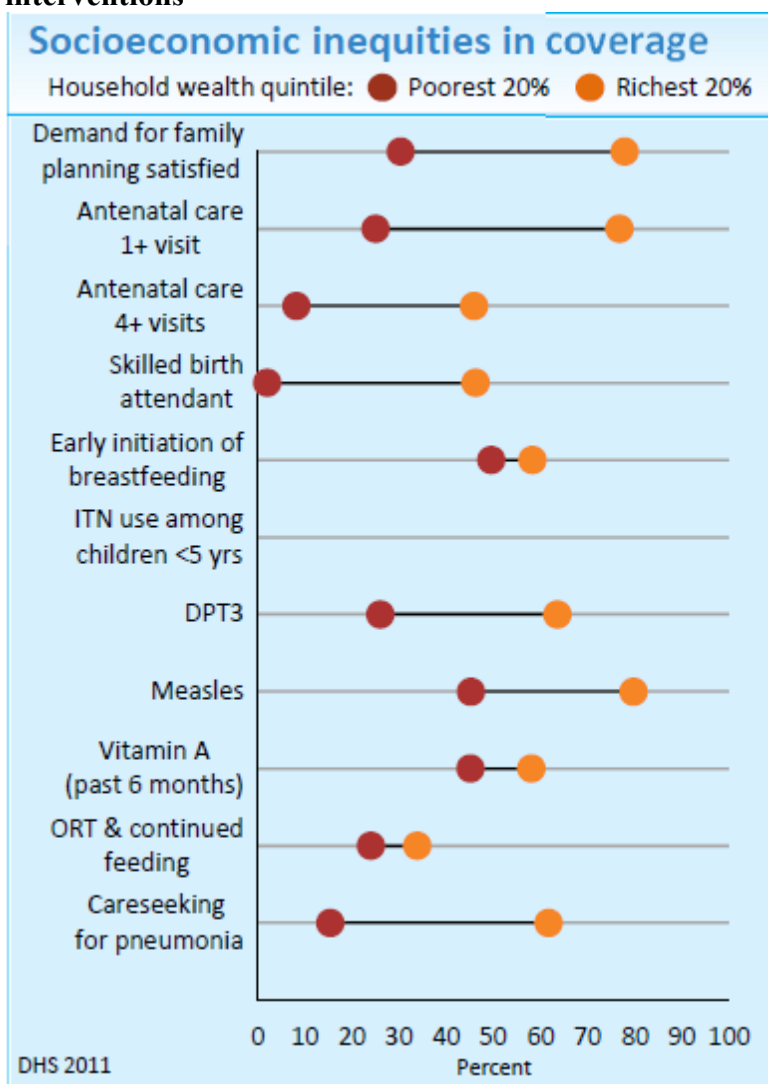
Source: WHO, UNICEF. *Countdown to 2015: Accountability for Maternal, Newborn and Child Survival*. Geneva, New York: WHO, UNICEF; 2013.

Figure 2: Cause of under-five deaths in Ethiopia



Source: WHO, UNICEF. *Countdown to 2015: Accountability for Maternal, Newborn and Child Survival*. Geneva, New York: WHO, UNICEF; 2013.

Figure 3: Inequities in coverage by household wealth quintile for selected interventions



Source: WHO, UNICEF. *Countdown to 2015: Accountability for Maternal, Newborn and Child Survival*. Geneva, New York: WHO, UNICEF; 2013.

Figure 4: Map of Oromia region



Source: Ethiopia Demography and Health. *Oromia*. Accessed 10 June 2012 from: <http://www.ethiodemographyandhealth.org/Oromia.html>.

Table 2: Key child health indicators in Oromia

Indicator	Rate/%^a	Year	Source
Under-five mortality rate	112/1,000 live births	2011	EDHS
Infant mortality rate	73/1,000 live births	2011	EDHS
Neonatal mortality rate	40/1,000 live births	2011	EDHS
Measles vaccination coverage	46%	2011	EDHS
DPT3 coverage	27%	2011	EDHS
Vitamin A supplementation (6-59 months, previous 6 months)	49%	2011	EDHS
Stunting (<2s.d.)	41%	2011	EDHS
Wasting (<2s.d.)	10%	2011	EDHS
Severe Acute Malnutrition (<3s.d.)	3%	2011	EDHS
Under-fives with fever in previous 2 weeks	15%	2011	EDHS
Under-fives with fever who took antimalarial	1%	2011	EDHS
Under-fives with diarrhea in previous 2 weeks	11%	2011	EDHS
Under-fives with diarrhea who took ORT	27%	2011	EDHS
Under-fives with ARI in previous 2 weeks	7%	2011	EDHS
Under-fives with ARI who took antibiotic	10%	2011	EDHS

Source: Central Statistical Agency [Ethiopia], ORC Macro. *Ethiopia Demographic and Health Survey (EDHS) 2011*. Addis Ababa, Calverton: Central Statistical Agency [Ethiopia], ORC Macro; 2012.

^a Regionally representative for Oromia; based on information from 2,250 households.

Table 3: HEW characteristics

Training	One year, includes practical training
Payment/incentives	Government employees with regular salary of around 670 birr (approximately \$38 USD) per month
Gender	Female
Literacy required	Yes
Education	Completed grade 10
From the community in which they work	Yes ^b
Community involved in selection	Yes ^b
Catchment population	5,000 per health post
Live in the community	Yes
Supervision	1 supervisor for 5 HPs (10 HEWs)

Source: Health Extension and Education Center. *Health Extension Program in Ethiopia: Profile*. Addis Ababa: Health Extension and Education Center; 2007.

^a Based on the exchange rate from September, 2011

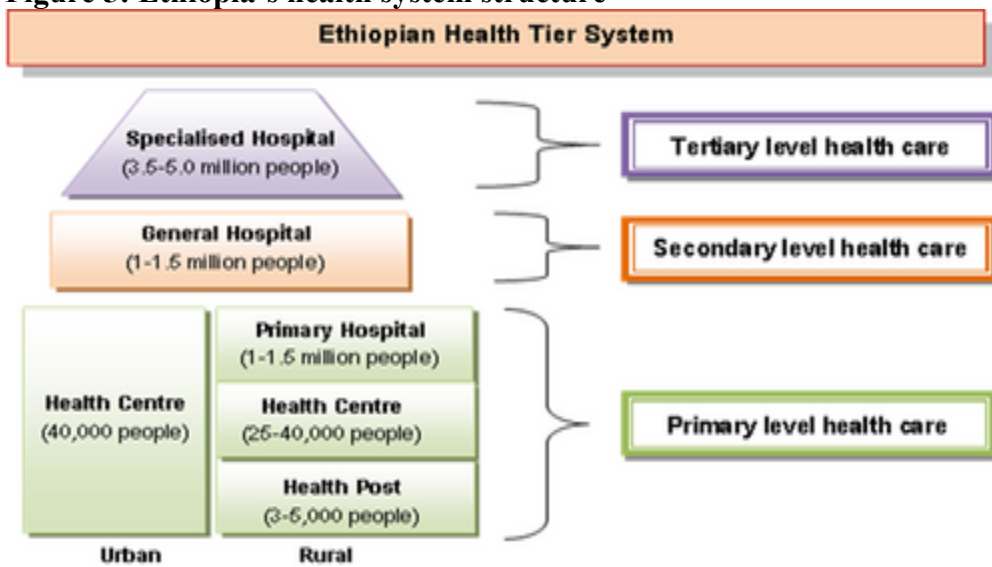
^b In policy but not always the case in practice

Table 4: HEP programs and service packages

Programs	Service packages
Disease prevention and control	HIV/AIDS STIs TB Malaria First aid
Case management of illnesses	Malaria Diarrhea Pneumonia Trachoma Helminthiasis
Family health	Maternal and child health Family planning Immunization Nutrition Adolescent reproductive health
Hygiene and environmental sanitation	Excreta disposal Solid and liquid waste disposal Water supply and safety Food hygiene and safety Healthy home environment Control of insects and rodents Personal hygiene
Health education and communication	Cross-cutting

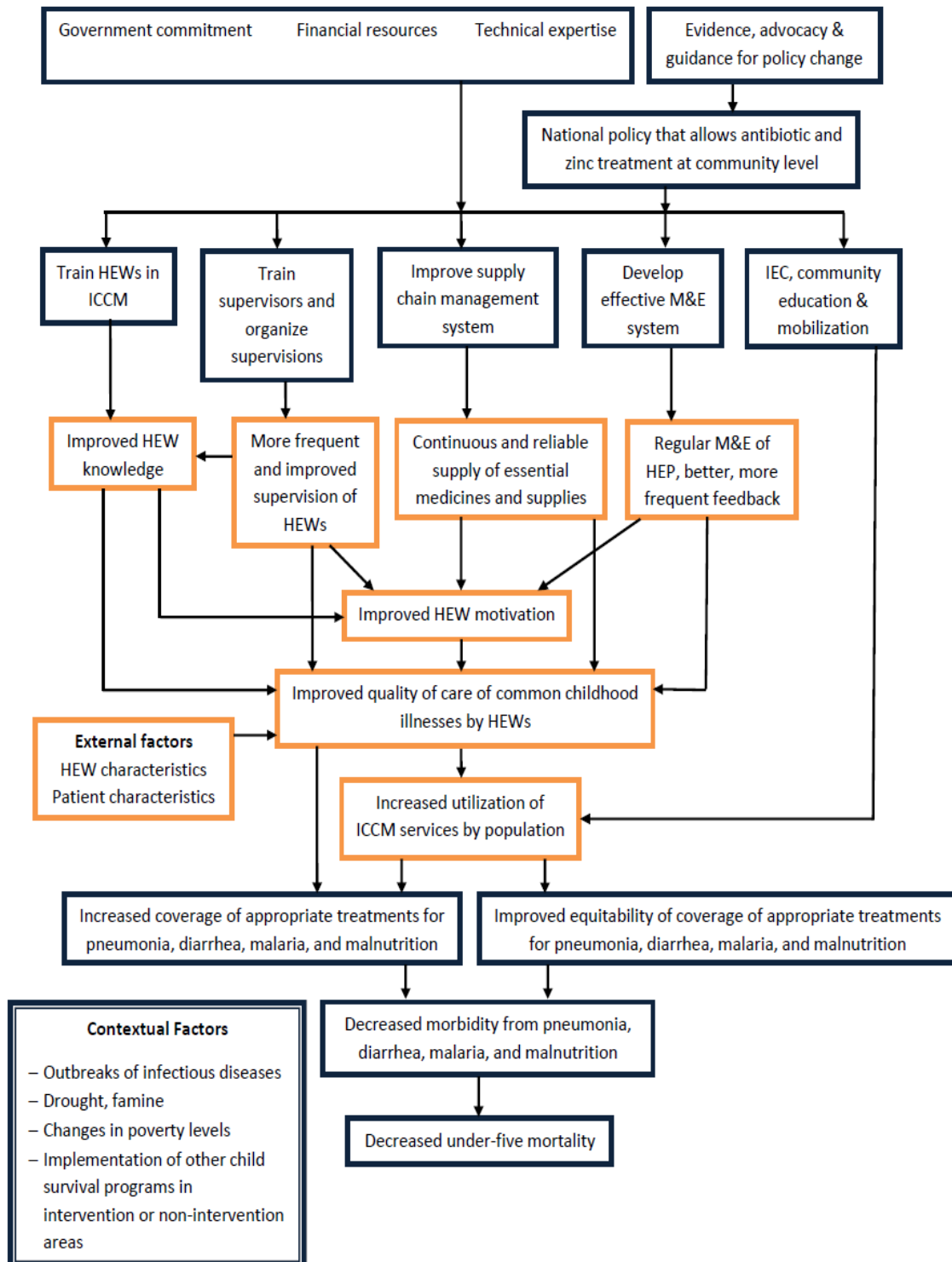
Source: Health Extension and Education Center. *Health Extension Program in Ethiopia: Profile*. Addis Ababa: Health Extension and Education Center; 2007.

Figure 5: Ethiopia's health system structure



Source: Health Extension and Education Center. *Health Extension Program in Ethiopia: Profile*. Addis Ababa: Health Extension and Education Center; 2007.

Figure 6: iCCM impact model



Source: Institute for International Programs

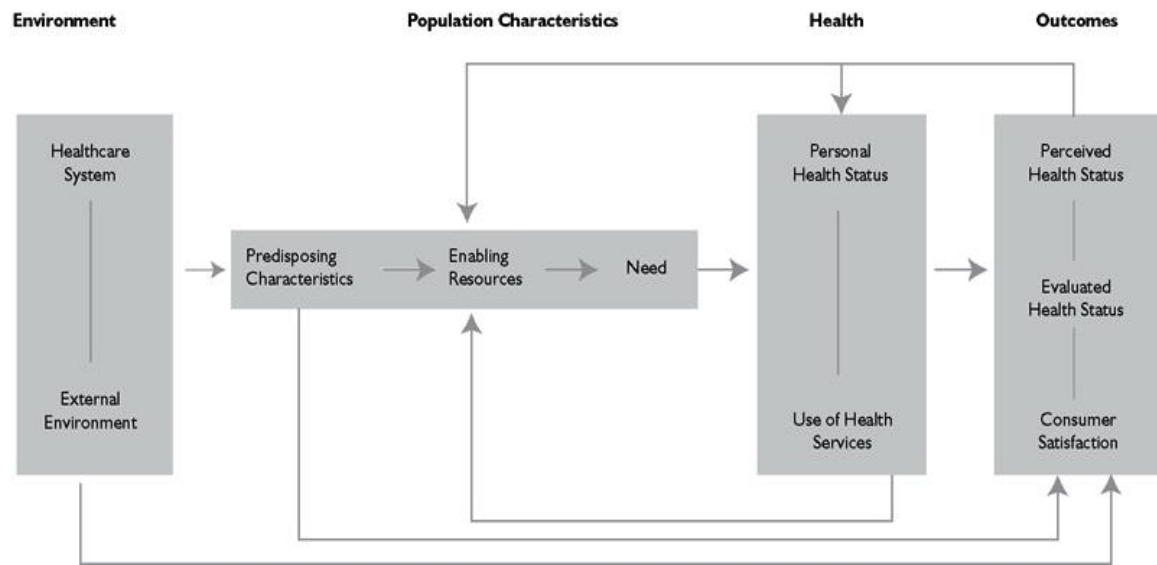
Table 5: Comparison of iCCM versus routine CCM guidelines and inputs

Routine CCM		iCCM
Management of iCCM illnesses for children 2-59 months		
Pneumonia	• Referral to health center	• Cotrimoxazole
Severe pneumonia	• Referral to health center	• Pre-referral treatment with cotrimoxazole
Diarrhea (no/some dehydration)	• ORS ^a /ORT ^b	• ORS/ORT
Severe diarrhea (severe dehydration, persistent diarrhea, severe persistent diarrhea, dysentery)	• ORS	• Zinc
	• Vitamin A (for persistent and severe persistent diarrhea only)	• ORS
	• Referral to health center	• Vitamin A (for persistent and severe persistent diarrhea only)
Malaria	• Antimalarial	• Referral to health center
Severe febrile disease	• Referral to health center	• Antimalarial
		• Pre-referral treatment with cotrimoxazole
Uncomplicated malnutrition	• RUTF or supplementary feeding program	• Referral to health center
Severe complicated malnutrition	• Pre-referral treatment with amoxicillin and vitamin A	• RUTF or supplementary feeding program
	• Referral to health center	• Pre-referral treatment with amoxicillin and vitamin A
		• Referral to health center
Program inputs		
Training	• No additional training	• 6-day training on iCCM
Supervision	• Standard government supervision	• Standardized supportive supervision on iCCM supported by partner NGOs plus standard government supervision
		• Bi-annual performance review and clinical mentoring meetings (PRCM)
Supply of commodities	• Standard government commodity supply chain system	• Support for purchase and supply of drugs and other commodities by UNICEF and partners
	• No additional supplies or job aids	• Provision of iCCM registers, iCCM chart booklets, timers and other supplies
Monitoring and evaluation	• Standard government monitoring and evaluation	• Enhanced data collection during supervisions and PRCM meetings
		• Data management support by UNICEF

^a Oral rehydration solution^b Oral rehydration therapy

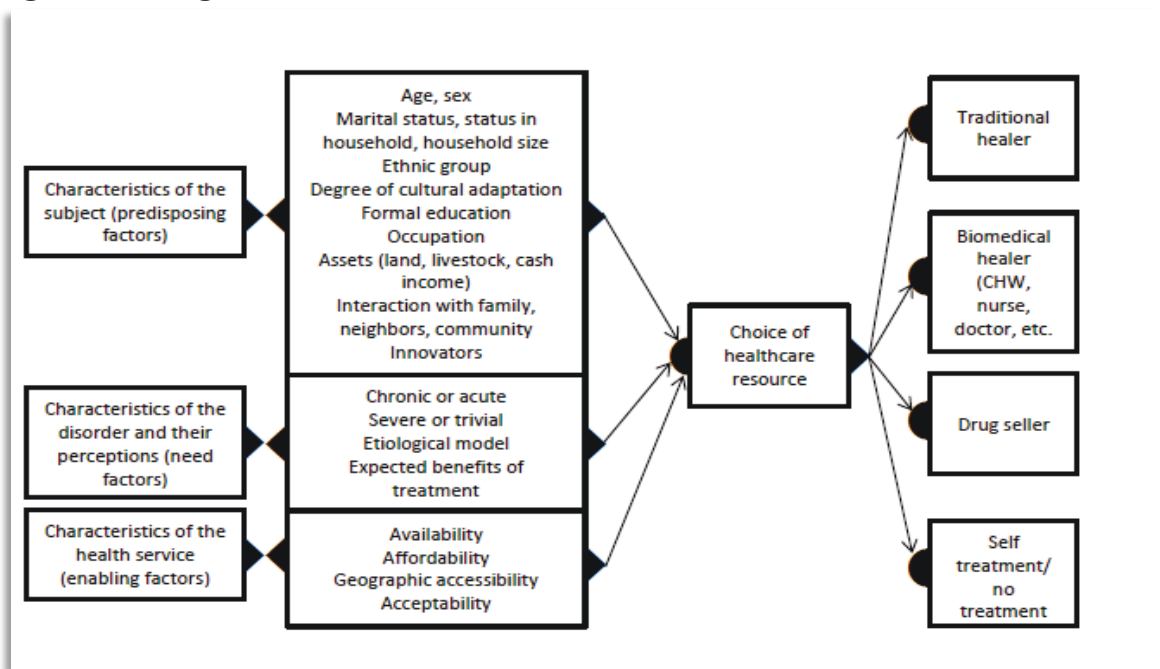
Source: UNICEF Ethiopia

Figure 7: Andersen's Health Services Utilization Model



Source: Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? *Journal of Health and Social Behavior*. 1995; **36**(1): 1-10.

Figure 8: Kroeger's Utilization of Health Services Model



Source: Adapted from Kroeger A. Anthropological and sociomedical health care research in developing countries. *Social Science and Medicine*. 1983; 17(3): 47–161.

Table 6: Ethiopia iCCM evaluation baseline survey care-seeking data

Care-seeking indicators	Fever Illness	ARI ^a	Diarrhea
Sought care any source (%)	35.8	39.4	27.3
Sought care appropriate source ^b (%)	23.4	28.1	16.4
Received appropriate treatment (%)	4.6	28.2	11.4 ^c
Sought care from health post/HEW (%)	3.7	4.5	4.3

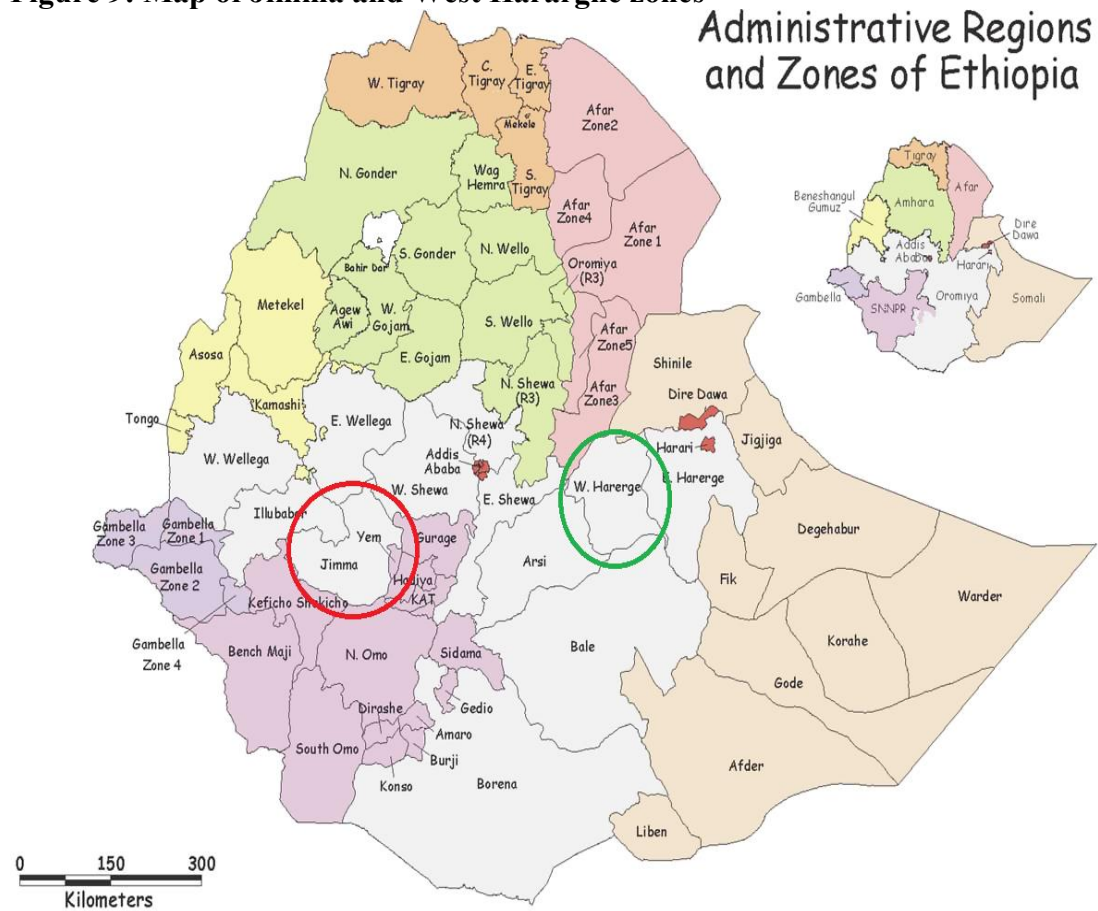
Source: Mela Research, PLC. *Baseline Coverage Survey for the Independent Prospective Evaluation of the Integrated Community Case Management (iCCM) in Oromia Region, Ethiopia: Draft Report*. Addis Ababa: Mela Research, PLC; 2011.

^a Acute respiratory infection

^b Appropriate source was defined as: providers in hospitals, health centers, health post, private and NGO health facilities. It excludes pharmacy, shop/vendor and traditional healers.

^c Oral rehydration therapy

Figure 9: Map of Jimma and West Hararghe zones



Jimma outlined in red, West Hararghe outlined in green
Source: Institute for International Programs

Table 7: iCCM evaluation intervention and comparison *woredas*

Jimma		West Hararghe	
Intervention <i>Woredas</i>	Comparison <i>Woredas</i>	Intervention <i>Woredas</i>	Comparison <i>Woredas</i>
Chora Botor	Dedo	Boke	Anchar
Gera	Gumay	Chiro	Burka dimtu
Goma	Limu Seka	Doba	Daro Labu
Kersa	Nono Benja	Gemechis	Habro
Limu Kosa	Seka Chokorsa	Guba Koricha	Mesela
Mana	Sokoru	Hawi Gudina	Mieso
Shebe Senbo	Tiro Afeta	Oda Bultum	Tulo
Omo Nada	Sigamo		
Setema			

Source: Institute for International Programs

Table 8: Selected characteristics of *kebele* sites in qualitative study

<i>Kebele</i> Site	<i>Woreda</i>	Utilization (# of sick child consultations in one month)	Distance to Referral Facility (in km)	Number of Sub-Villages	Size of <i>kebele</i> (in square km)
<i>Jimma</i>					
Site 1	Goma	Low (2)	Far (23)	3	13
Site 2	Omo Nada	High (63)	Near (8)	4	9
Site 3	Shebe Seneba	Low (6)	Far (31)	5	18
Site 4	Kersa	High (95)	Near (10)	3	10
<i>West Hararghe</i>					
Site 5	Oda Bultum	Low (1)	Near (5)	4	12
Site 6	Gemechis	Low (3)	Near (3)	3	19
Site 7	Boke	High (34)	Far (25)	2	26
Site 8	Boke	High (51)	Far (13)	3	14

Source: Miller N. *Integrated Community Case Management of Childhood Illness in Ethiopia: Implementation Strength and Quality of Care*. Dissertation Report. Baltimore: Johns Hopkins University; 2013.

Table 9: Sample size at each site and total sample size by research technique for qualitative study

Technique, Population	Per Site	At All Sites
FGD, Mothers	2 (6-12 individuals)	16 (132 individuals)
IDI, Mothers	4-6	40
IDI, Fathers	2	16
IDI, HEWs	1-2	10
IDI, VCHW/HDA ^a	1-2	12
<i>Total</i>	<i>10-14</i>	<i>94</i>

^a Volunteer community health worker and/or member of the Health Development Army

Table 10: Variables used in analysis and operational definitions

Variables	Operational definition	Categories
Outcome variable		
HEW/health post use	Reported use of HEW/health post for child sick with diarrhea, fever and/or suspected pneumonia in the two weeks preceding the interview.	(0) Did not use HEW/health post (1) Used HEW/health post
Covariates		
<i>Predisposing factors</i>		
Zone	Geographic zone of residence.	(0) Jimma (1) West Hararghe
Religion	Reported religion of primary caregiver.	(0) Muslim (1) Christian/other
Maternal age	Reported age in completed years of mother/caregiver.	(0) 20-29 (ref) (1) 15-19 (2) 30-39 (4) 40-49
Maternal education	Reported number of years of schooling; categorized as 0 years versus > 0 years	(0) No formal education (1) Some formal education
Caregiver awareness of IMCI child health danger signs	Response to open-ended question; categorized based on mean of number of danger signs mentioned among pre-coded response including: Not able to drink or breastfeed (or drinks poorly) Develops fever Fast breathing Difficult breathing Blood in stool Lethargy Vomiting Convulsions Unconscious Other (specify).	(0) ≤ 2 signs mentioned (1) 3-9 signs mentioned
<i>Enabling factors</i>		
Household wealth	Quintiles of household in survey based on composite index of reported housing and household assets created through principal components factor analysis scaling. Categories collapsed into poorest 40%,	(0) Poorest 40% (1) Middle 40% (2) Wealthiest 20%

	middle 40% and wealthiest 20%.	
Household size	Reported number of individuals listed as residing at or sleeping under the roof of a dwelling in the previous night.	(0) 4-6 individuals (ref) (1) 1-3 (2) > 6
Distance of household from nearest health post	Reported walking time in minutes/hours from the household to the health post.	(0) 1-30 minutes (1) 31-60 (2) > 60
Awareness of the availability of child health treatments at the health post	Response to open-ended question; categorized based on mean of number of danger signs mentioned among pre-coded response including: Treat sick children Provide health information Refer sick people to health center Give vaccinations Assist deliveries of newborn children Family planning Antenatal care Sanitation and hygiene information Other (specify).	(0) Treat sick children option not mentioned (1) Mentioned
Previous use of HEW/health post	Based on self-report for previous use of the HEW/health post for a previous child illness	(0) Never used (1) Previously used
<i>Need factors</i>		
Experience of child death	Reported loss of child (biological).	(0) No deaths (1) Experienced at least one child death
Child gender	Reported sex of child.	(0) Male (1) Female
Child age	Reported age in completed years of child.	(0) 1 (ref) (1) < 1 (2) 2 (3) 3 (4) 4
Illness type	Classification of child based on report of symptoms in previous two weeks for a sick child. Diarrhea indicated by the presence of diarrhea. Fever indicated by the presence of fever. Pneumonia indicated by the presence of cough with difficulty breathing and/or problems of the chest. Multiple illnesses were possible.	(0) Diarrhea only (1) Diarrhea + fever (2) Diarrhea + fever + pneumonia (3) Fever only (4) Fever + pneumonia (5) Pneumonia only

Paper 1: A Qualitative Exploration of Care-Seeking Pathways for Sick Children in the Rural Oromia Region of Ethiopia

1. Introduction

Over the previous decade, Ethiopia has recorded notable progress in child health outcomes. In 2013, Ethiopia met the fourth Millennium Development Goal (MDG-4) target of reducing child mortality by two-thirds since 1990.¹ Much of this success has been attributed to the rapid expansion of health care infrastructure, primary care coverage and scale up of community-based child health interventions to Ethiopia's underserved and largely rural communities.²⁻⁴ Despite these improvements, utilization of biomedical sources of care for sick children remain low, with less than one-third of caregivers seeking care from these sources for a child sick with diarrhea, malaria or pneumonia.⁵ Consequently, rates of use of evidence-based child illness treatments such as oral rehydration solution (ORS) for diarrhea, antimalarials for malaria and antibiotics for pneumonia are also low.⁵

Service utilization studies in sub-Saharan Africa (SSA) have demonstrated a number of reasons potentially accounting for low use of biomedical services. Most studies in public health are quantitative and focus on specific barriers to access such as cost and transportation or key demographic characteristics associated with use of biomedical providers.⁶⁻¹⁰ However, these models have been criticized as static, reductive and detached from the everyday lives and decisions of health care consumers.¹¹⁻¹³ They also miss out on the majority of health behaviors and actions that take place outside the formal care sector.¹⁴⁻¹⁵ Studies using frameworks and methodologies from anthropology

often demonstrate that concerns such as cost and distance are but one factor accounting for care-seeking choices and often expand the focus to a wider exploration of sociocultural processes and locally-available care and treatment providers.¹⁶⁻²⁰ These studies often study the pathways and key influences at specific points (e.g., recognition of illness, decision to seek care, choice of care provider, etc.) over the course of a child illness episode.^{13,21} Each of these steps is influenced by a range of interrelated sociocultural norms, decision-making practices and socioeconomic constraints interacting with and within local and national healthcare systems.²²⁻²³ According to Leach and colleagues, care-seeking actions are often pragmatic and based on more salient distinctions such as familiarity with a source as opposed to those between “appropriate/inappropriate” or “biomedical/traditional” care and treatments.²⁴ According to these researchers, focusing solely on use of biomedical options limits the ability of researchers to understand the full range of care-seeking behaviors.

Although low rates of use of formal biomedical sources and treatments have been widely documented in rural Ethiopia,²⁵⁻²⁸ few studies have qualitatively explored reasons for this phenomenon. Most service utilization studies in Ethiopia occurred prior to significant investments and national primary and child health programs such as the scale up of the health extension program (HEP) and inclusion of community case management (CCM) of common childhood illnesses delivered by health extension workers (HEWs) at rural health posts. Furthermore, none have examined the sociocultural context of care seeking for common childhood illnesses or elicited care-seeking narratives from caregivers themselves. Consequently, little is known about when, where and why caregivers seek care and treatment for sick children throughout the course of a child’s

sickness. Furthermore, recent large-scale, quantitative surveys conducted in rural Ethiopia have suggested extremely low rates of care seeking from informal sources such as traditional healers and informal drug vendors, and that the majority of caregivers do not leave the home to seek care for sick children.²⁹⁻³⁰

This study aims to explore when, where and why caregivers seek care and treatment when they believe their child is ill. It seeks to provide context for findings of low utilization of formal biomedical sources where evidence-based child illness treatments can be obtained in rural Oromia, Ethiopia. These sources include HEWs located at health posts within rural communities as well as health centers and private clinics in nearby (approximately 5-30 km) towns. It also examines the credibility of findings from recent quantitative surveys conducted in rural Ethiopia suggesting extremely low rates of care seeking from informal sources. The study used qualitative methods to explore: (1) conceptualizations of child illness and illnesses; (2) influences on actions and decision-making processes occurring over the course of a child's illness; and (3) available sources of child illness care and treatment and caregiver perceptions and experiences with these sources. The goal is to provide a more comprehensive understanding of child illness and care-seeking actions in the rural Ethiopian context and to use this information to guide public health programs to design culturally-sensitive and relevant child health interventions for caregivers and children.

2. Methods

The qualitative research was conducted as part of a series of studies focused on the evaluation of Ethiopia's scale-up of integrated community case management (iCCM) of common childhood illnesses in rural areas of the Oromia region. Data collection was

conducted for 30 days from December 2012 to January 2013. Eight rural *kebele*^{††} sites, each corresponding to one health post catchment area serving approximately 5,000 individuals, were purposively selected from sites where iCCM implementation and scale up has been occurring for at least two years in the zones of Jimma and West Hararghe. Purposive selection was based on existing information for health post utilization and distance from nearest health referral facility located in an urban center. Sites were selected to achieve maximum variation for these factors. Characteristics of selected *kebele* sites are presented in Table 1.

The study design was informed by rapid ethnographic assessments developed as part of applied anthropological research methods focusing specifically on child health and care-seeking behaviors.³¹⁻³² One team of four college-educated, Afan Oromo-speaking investigators with experience in qualitative research methods were trained and conducted the research supervised by the first author. Qualitative methods consisted of focus group discussions (FGDs) and in-depth interviews (IDIs). FGDs focused on social norms of care seeking and community perceptions of local sources of care. IDIs focused on eliciting a narrative of care-seeking experiences and strategies during the most recent child illness.³³

Study participants were selected with the assistance of community leaders, volunteer community health workers and local members of the Health Development Army. Investigators also canvassed *kebele* villages and invited those present to increase representation from all sub-villages. Sampling for FGDs focused on mothers of children under the age of five. Sixteen FGDs were held and with eight each in Jimma and West Hararghe. Forty IDIs were held with mothers of children under the age of five screened

^{††} A *kebele* is the lowest administrative unit, followed by *woredas* (districts), zones and regions.

for having experienced a recent child illness over the previous one month. For additional context and perspectives, 16 IDIs were held with a subset of these women's husbands and 22 IDIs were held with HEWs and community health volunteers. Table 2 gives the sample size for each method and population. All research interactions were conducted in Afan Oromo and with verbal consent.

The first author conducted daily debriefing sessions with investigators to discuss key findings, determine saturation of themes and refine data collection. FGDs and IDIs were audio-recorded, transcribed into English and assessed for quality. Data were analyzed qualitative data using Atlas.ti software (Development SS, Berlin). Grounded theory as conceived by Charmaz was used to guide data analysis.³⁴ Grounded theory was chosen because little was known about care-seeking behaviors in these areas and the goal was to derive a general “theory” outlining care seeking patterns. Dominant themes were identified through open coding of a select number of transcripts to construct a code book. Axial coding, relating open codes to each other, was also performed. Memos were created to organize patterns in key themes and visual representations (e.g., patterns of sources used). During analysis, data were compared across sites, methods and participant groups to triangulate findings.

The study received ethical approval from the Oromia Region Health Bureau and Johns Hopkins Bloomberg School of Public Health.

3. Results

3.1 Conceptualization of child illness

For many participants in this study, child illness was seen as a deviation from an ideal state of *joli si'a ina qaba* (“child full of health/energy”). This was often contrasted

with *joli lafu*, a term denoting both acute and long-term child “weakness.” *Lafu* was the most common initial symptom noted by caregivers, regardless of the perceived illness label and was recognized primarily by observations of diminished play and activity, appetite and general lethargy. *Lafu* was often perceived as existing independently from and as a contributing cause to a current illness episode through increased vulnerability to other causative factors. *Lafu* itself was primarily attributed to incorrect or inadequate treatment of previous illnesses, poor nutrition and/or supernatural causes. According to several FGD participants, traditional medicines (*qoricha Oromo* or *qoricha wabiya*), consisting largely of herbs and amulets given by the hand of a respected elder, are the correct treatment of *lafu* as discussed in the following FGD:

P₁: We give qoricha Oromo for lafu to return a child to joli si'a qaba.

P₂: Other medicines will cure a cough but if qoricha Oromo is not given, the cough will return. (FGD, mothers, Jimma)

Participants made several general distinctions in child illnesses based on perceptions of etiology, severity and appropriate treatment modality. Severe illnesses were often indicated by the use of the terms *ibidda* (Jimma) and *cimma* (West Hararghe) and frequently attributed to a compounding of causal factors and distinguished from common, everyday child illnesses (*dhukuba joli*). The most common distinction was between illnesses and symptoms that should be treated with *qoricha Oromo* and those treated with *tijaniya* (“modern”) or biomedical drugs. In general, herbal medicines and more specialized *qoricha Oromo* were seen as appropriate for common illnesses or those with suspected supernatural causes and *tijaniya* medicines were thought appropriate for severe illnesses. Despite most participants subscribing to these distinctions, there was

frequently debate and ambiguity when classifying particular symptoms or illnesses into these categories such as seen in the following exchange:

P₁: There are many kinds of diarrhea in our children. There is white diarrhea. This is very cimma and requires the hands of an elder knowing qoricha Oromo to undo the work of buda nyate [evil eye].

P₂: She does not talk sense. We do not hold these wabiya [traditional] beliefs any longer. Diarrhea is because a child has eaten polluted foods. It becomes cimma because a mother does not go for tijaniya medicines at the health post.

P₃: It is God's will if a child gets diarrhea.

P₄: But we must not let our children die. We must know the name of the illness and get medicines to prevent their suffering. (FGD, mothers, West Hararghe)

Ultimately, there was considerable variation, levels and overlap in perceptions of etiology, symptoms and severity of illnesses making generalizations across sites difficult and tenuous. This ambiguity in social norms was frequently reflected in child care-seeking narratives, with caregivers portraying the process of determining the nature and name of an illness as a dynamic and contested process characterized by a large degree of uncertainty.

3.2 Labeling of child illness

For most child illness episodes, the mother was the first to recognize illness symptoms, commonly *lafu*, in their children. Upon recognition, most mothers began engagement with their lay referral network, commonly elderly family members and neighbor women with children, to seek advice in order to “give a name to the illness.” This act of labeling an illness was regarded as an essential action in order to understand

the nature of an illness and to justify and facilitate a course of care-seeking actions such as in the following mother's experience:

R: I suspected she [child] was ill when she stayed in the house and did not want to leave. After one day, she was lafu and I asked my neighbor to assist in giving a name to the illness because I was worried about taking the right steps to treat her. We agreed it was qora [similar to "flu" in Jimma] and to treat her with herbs in the home, but this became ibidda. My neighbor said that this was michi somba ["lung/breathing illness"] and that I should take the child to town for treatment.

I: You said you were worried about taking the right steps?

R: I do not want to worry my husband if she does not require money for treatment.

We did not know the illness. I must know before worrying my husband. (IDI, mother, Jimma)

For others, especially those suggesting easy access to care providers, naming the illness was bound up in the care-seeking process as caregivers enlisted multiple sources of care and relied on care providers to name the illness.

I have little education and no knowledge of medicines. Only elders have this knowledge now. I took her [child] to try qoricha Oromo from my mother-in-law to name her illness. She said many things which were unknown to me or that I did not agree with. I took her to the health post to see what her illness was and the source of her illness. I trusted her [HEW] to tell me why my child suffers. (IDI, mother, Jimma)

As this quote suggests, illness interpretations were dynamic, contested and often shifted with the inclusion of additional "lay" and "expert" consultation. Caregivers in this study were often explicitly aware of the social meanings and consequences that proceeded from

naming the illness. In FGD discussions of etiology, participants often supported the statement that: “[Child illness] happens due to a mother’s carelessness. It is a mother’s duty to protect her children from harm.” This was especially common in illnesses perceived as caused by exposure to supernatural forces or environmental extremes.

Aware of the potential for blame, caregivers often actively negotiated illness interpretations to avoid blame such as the following:

My husband’s mother said my actions were the cause of my child’s breathing problems and that I should not have taken her be attacked by the wind. I did not believe her words and I did not want others to accept her thinking that I neglect my child. I took the child to the health post because [the HEW] would tell me the cause.

(IDI, mother, West Hararghe)

Caregivers were also aware of the potential economic consequences associated with naming an illness. A father from a poor household stated:

Our neighbors said the [illness] name was busaa [malaria] and that we should seek treatment in [urban town] right away. My wife told me to prepare for this treatment, but it is costly and I could not get a loan for transportation to visit [the town]. We discussed the illness with my sister who has seen busaa. She said it was not serious and we should treat the child at home with herbal baths. (IDI, father, Jimma)

As can be seen from this passage, highlighting one illness interpretation over another could be a potential coping strategy when confronting constraints on preferred care-seeking strategies.

Most HEWs and VCHWs suggested that problems relating to recognition stemmed from a lack of awareness and knowledge of child illnesses. Some even

suggested that this lack of awareness was due to “carelessness” and “ignorance” of mothers. Others, however, recognized that mothers are often aware and motivated to take their child for treatments, but are unable to do so due to a range of barriers, a perception supported by one VCHW: *“We give them education and they know to take their child for care, but they are poor. What can they do?”*

3.3 Decision to seek care outside the home

Despite a general perception among HEW informants that *“mothers in this community will not leave their home when their child is sick,”* care and treatment was sought outside the household in nearly three-fourths of the care-seeking episodes discussed in this study. The decision to seek care outside the home often began with a perceived failure of self-treatment in ameliorating a child’s symptoms. Alternatively, some mothers also suggested that home-based actions were successful in aiding in interpretation of an illness and the given interpretation warranted stronger treatments. For most caregivers, decisions to seek care outside the home were influenced by the involvement and decision-making dynamics within a caregiver’s lay referral network, especially involving their husbands, and the resulting illness label and perceptions of severity.

Twelve caregivers took actions only in the home and stated that their child’s illness and symptoms resolved without complications. In most of these narratives, caregivers suggested a clear illness label and understanding, perceptions of severity were generally low and caregivers stated they had knowledge of effective home-based actions based on previous child health episodes. For these reasons, there was also less

involvement of fathers and other members of their lay referral networks, with a mother often making decisions herself or with the support of a limited number of social others.

For the remaining mothers, illness interpretations were often uncertain and the majority of mothers engaged with their lay referral networks. Most of these mothers explicitly expressed a desire to seek care outside their home in an effort to resolve both uncertainty and their child's illness. This desire was especially pronounced when a mother perceived her child's illness as becoming more severe as related by an FGD participant:

P: Home remedies are only for guba [common fever]. There are no home remedies for ibidda guba [severe fever]. If a mother keeps a child with ibidda guba in the home, that child will die. All mothers should know this and act urgently.

I: Why would a mother stay in the home if her child has ibidda guba?

P: She may be ignorant of the seriousness. She may be kept there by her husband.

(FGD, mothers, Jimma)

Whereas men were commonly regarded as passive during illness recognition, diagnosis and home-based care, most mothers suggested that they took a more active role in the decision to seek care outside the household. This was especially common if there were some costs associated with care seeking, treatment required long absences of the mother from her domestic responsibilities or transport of the child and securing treatments required the physical assistance of the father. In these instances, many mothers agreed that *"it is our duty to gain permission from our husbands to leave the home for treatment."*

For fathers, the decision to seek care outside the home often depended on perceptions of financial costs associated with care seeking and awareness and perceptions of efficacy of available treatment sources. Most saw their role in care seeking as ensuring the least expensive and most efficacious mode of treatment, as related by the following father:

Women are emotional and they can make bad decisions. There are many sellers of useless herbs and drugs and they easily cheat women. She [mother] would spend all of our family's money for one child without thinking. When she is thinking of the child's health, I am thinking of the family's health. (IDI, father, Jimma)

Although men were commonly perceived as barriers to care seeking outside the home in FGDs, most IDI informants suggested that, though their husbands held the ultimate authority in this decision, decisions to seek care outside the home were often collaborative in nature. However, a husband's influence on decision making could cause significant delays, but only two mothers stated that they were actively prevented by their husbands from seeking care outside the home.

For approximately one-third of mothers interviewed, husbands were characterized as only passively involved in the decision to seek care outside the household, especially in West Hararghe. Several stated that when their husbands were unavailable, they would decide to access care or social support without them, such as the following informant:

I did not concern my husband when going to the market [for medicines]. I had money left over for some medicines. He is busy working in the fields and chews chaat [mild stimulant chewed in Ethiopia] all day. I told him when I returned, but he was not

concerned. He will not be concerned until I convince him of the serious harm facing our child. (IDI, mother, West Hararghe)

Many of their husbands interviewed suggested that they deferred decision making of initial care-seeking choices to their wives, elder family members and sisters often stating that this is a “*woman’s concern*.” In some instances, members of a mother’s lay referral network were enlisted to support a mother’s desire to seek care outside the household and persuade hesitant husbands.

3.4 Delay in seeking care outside the home

Most mothers seeking care outside the household stated that they waited for more than 24 hours before leaving the home to seek care for their sick child. The most common reasons given for delaying care seeking outside the home related to negotiations and disagreements within the household about the decision to seek care outside the home and desired care-seeking choices. Additional reasons given were: uncertainty about illness progression, difficulties with access to treatment, apprehensions about presenting to providers and the exigencies of daily life.

In nearly half of these households there was some disagreement on the type and timing of care seeking, which could cause delay. Disagreements related to expectations of costs associated with care seeking outside the home, differing illness interpretations and, related to this, the perceived likelihood of recovery following a particular course of care seeking. The majority of disagreements were between husbands and wives, often relating to expectations of cost but were also between a wife and her husband’s elderly relatives, relating to differing illness interpretations. The dynamics and level of disagreement and length of delays varied considerably as portrayed in the following quote:

I told my husband we must not wait because her breathing was worsening. He worried over money and did not want to give money for the wrong treatments. We argued over the right actions. After two or three days, I received assistance from neighbors who said they would lend money and talk to my husband. He then went to buy medicines. (IDI, mother, Jimma)

This account also suggests that some mothers are able to actively utilize social support and care providers to resolve disagreements and validate care-seeking actions.

Uncertainty in recognizing a child's symptoms and illness continued as caregivers monitored and assessed illness progression in the home and could potentially lead to delays in care seeking outside the home. Despite suggesting that their child's illness was serious, many caregivers still expressed uncertainty regarding particular, often unfamiliar, symptoms and the transition from common to severe illness, weighing these against the social and economic implications of care-seeking actions.

We gave him barzafe [local herb] at home to see if he would improve. We did this for three nights but his diarrhea continued the next day. I believed he could suffer no longer and his condition was serious. Then his diarrhea was like mucous. I did not know the meaning of this change, and hoped he was becoming cured. I continued with herbs until his eyes dulled and I asked my husband to take him for qorricha Oromo [from elders]. (IDI, mother, West Hararghe)

Like this mother, many continued to delay in the hope that their child's illness was self-limiting and had difficulties in determining meanings associated with changes in symptoms and the appropriateness of care-seeking actions.

Another common source of delayed care seeking outside the home related to availability and access to treatment. This could be due to both a caregiver's anticipation of difficulties or actual experience. Some caregivers noted being apprehensive about the economic effects on the household of a child's illness such and the difficulties of limited access to financial resources of households and, especially for female caregivers. The cost and efforts at transporting a child or caregiver were a primary concern, especially during the wet season, and frequently led to delays as caregivers organized resources and transportation.

A small number of caregivers, especially younger mothers, also suggested that they often waited to learn more about their child's symptoms through trying home remedies, monitoring their child's condition and eliciting informational support from their lay referral network. Most of these women suggested that they waited to ensure that they were taking the right actions in the eyes of their peers. One stated that:

I was fearful of sending my husband for medicines. I was fearful of taking her to the health post. They want me to tell them her illness. If I do not know, they will call me ignorant and will not treat her well and they may cheat me. I talked to others to learn her [child] illness so they will not believe that I am ignorant. (IDI, mother, West Hararghe)

Nearly all caregivers agreed that care taking of a child, especially during sickness, is primarily a mother's responsibility. However, many informants stressed that this is only one of the many responsibilities of a woman in rural Oromia, responsibilities that may compete with a mother's ability to recognize and act upon a child's illness. One mother ended an FGD with this a statement:

We are proud to be mothers and do our duties to watch over our children, but we women are overworked. We have many responsibilities in our household and in our village. When our child is sick, we must leave our other children unsupervised and unfed. We may spend money if it is serious, but we have no money. Our lives are difficult and our children suffer. (FGD, mothers, West Hararghe)

3.5 Perceptions and choice of care provider

The care-seeking behaviors reported in this study revealed a broad range of providers reflecting a mixed market of, often overlapping, public, private, biomedical and traditional health services. The most common options at the local community level mentioned by caregivers were: drug peddlers, informal traditional herbalists, rural drug vendors and HEWs at the health post. A small number of caregivers also mentioned public health centers and private clinics and pharmacies in the nearest urban center. Other less common sources mentioned included traditional healers and spiritualists.

For caregivers in this study, the decision to utilize a particular course of care and treatment was influenced by perceptions of appropriateness and efficacy of a provider or treatment, both of which acted to shape a caregiver's preferences. These preferences were weighed against perceptions and realities of accessibility of care sources. Both preferences and accessibility were moderated by the inclusion of a caregiver's lay referral network.

The "power" (*dawa jaba*) and efficacy of treatments and drugs distributed by a provider was the primary consideration for most caregivers in preferring one source to another. In general, local herbs were seen as the least powerful treatment and biomedical drugs were seen as the most powerful. Perceptions of the power of *qoricha Oromo*,

distributed by elders, herbalists and traditional healers varied depending on attitudes toward traditional medicine. For those with positive attitudes, the power of *qoricha* *Oromo* was largely based on its ability to counter potential supernatural causes for a child's condition and to cure *lafu*. For biomedical treatments, the form rather than nature indicated the power of a drug for most participants. ORS and tablets were seen as having the least power followed by syrups and finally, injections, perceived as the most powerful. The source of drugs was also seen as contributing to the power of a treatment with urban sources often perceived as superior to community-based services. A small number of informants suggested that perceptions of the ability and willingness of a provider to dispense a biomedical drug of desired power were influential in treatment choice. These caregivers suggested that urban providers and rural drug vendors were often the most able to provide powerful drugs, drug peddlers were the most willing and HEWs were the least willing and able.

Despite these perceptions, many caregivers suggested that the most powerful drug was not always the most effective and that they chose a treatment of appropriate power based on a caregiver's provisional understanding of their child's illness.

P₁: A child's blood is weak.

P₂: Some children are lafu.

P₁: Yes, these children are very weak. We do not give these children powerful drugs because they may die. These are only for adults and older children.

P₃: A child can take powerful drugs if they are prepared.

I: How do you prepare a child?

P₃: A child must be given strength. There are herbs that elders know to give strength to a child. They know herbs to protect a child against harm.

P₁: And to strengthen medicines. (FGD, mothers, West Hararghe)

Like these participants, several caregivers expressed concern about the potential side effects of powerful drugs. This perception was especially pronounced for very young children (under the age of two months) and many caregivers deemed biomedical drugs harmful for these children. For these reasons, illnesses of lower perceived severity and very young children were often treated with herbal medicines instead. As related by these participants, herbal medicines are also useful for strengthening children, mitigating the side effects of powerful drugs and amplifying the power of other treatments. Biomedical drugs were often preferred for illnesses perceived as more severe. In the many cases in which uncertainty about the severity and nature of a child's illness persisted, caregivers tended to engage in a trial-and-error search aimed both at minimizing uncertainty and alleviating a child's symptoms. These strategies typically began with sources such as herbalists that are perceived to provide greater understandings of a child's illness and to have less potential for dangerous consequences such as using powerful drugs.

In addition to ideas about efficacy in relation to an illness interpretation, provider preferences also commonly depended upon on expectations of caregiver-provider interactions. When discussing her experiences interacting with health centers and HEWs one mother stated:

I am proud to be a good Oromo mother with some education, but I am not treated well when I go to government services for my child. They see us as superstitious and

ignorant. They ask us why we did not come sooner and tell us we are to blame if our child dies. (FGD, mothers, West Hararghe)

Like this mother, some caregivers noted previous instances (or during their most recent care-seeking experience) in which they felt disrespected and judged as “ignorant” or blamed as “bad mothers.” The expectation of being negatively judged was commonly reported as an explanation for avoiding or delaying care seeking from government health centers and, at some sites, HEWs and opting for other providers where they would receive more respectful care. Most caregivers also noted expectations of understanding more about their child’s condition such as the cause and illness label during a provider interaction such as the following exchange:

R: We did not know the cause of this sound [“grunting”]. We thought she suffered from qora [flu] but this was not qora. We asked the village herbalist to explain the meaning of her [child]. We did not know if she had medicines for this, but she [herbalist] told us that it was serious and was because her lungs were fighting the cold wind. We went to the health post immediately after.

I: Why did you not immediately go to the health post?

R: The worker will not tell us why our child suffers. I don’t understand her [HEW] words. (IDI, mother, Jimma)

For this reason, elders, herbalists, and to a lesser extent, HEWs, were often preferred for their willingness to provide culturally and socially understood meanings and greater understanding of their child’s illness. This understanding was seen as instrumental in facilitating respectful communication between a caregiver and provider and led many mothers initially uncertain of their child’s illness to prefer these providers.

Less commonly mentioned preferences related to the appropriateness of a provider in relation to illness perceptions such as suspected cause and to personal trust of particular providers. For those caregivers suspecting supernatural causation, providers of *qoricha Oromo* (and traditional healers and spiritual healers when available) were preferred, although often concurrently with other sources. In this study, there did not appear to be any clear preferences based on whether the illness was related to diarrhea, fever or respiratory problems. When speaking of trust in relation to drug peddlers, most caregivers were wary of being cheated or given inadequate drugs by these providers. In relation to HEWs, some caregivers noted distrusting a particular HEW as an outsider to their village or as having a greater allegiance to another sub-village. At two sites, conflict between an HEW and religious leaders (due to family planning activities) led to mistrust of their child health services. Finally, several caregivers also noted distrusting and avoiding sources that might potentially blame the mother for her child's condition.

Despite these preferences, most caregivers noted a range of access-related barriers prevented them from acting upon their desired care-seeking course. Although urban care options such as health centers, private clinics and pharmacies were commonly perceived as the source of the highest quality of service and treatments, these sources were infrequently utilized due to significant financial and transportation barriers. Two study sites were within a two-hour walk to an urban center and caregivers from these sites accounted for all utilization of private urban providers and by passing of the health post to the health center. For the remaining sites, except for instances of referral to a health center, care seeking was predominantly from community-based providers. While HEWs and health posts were designed to bring free and quality services closer to rural

households, caregivers (especially from households greater than one-hour walk) still noted long distances, geographical barriers such as hills, forests and rivers, poor paths, inadequate transportation services and difficulties carrying sick children—all compounded during the wet season—as significant barriers to accessing the health post as noted by the following informant:

We are told to visit the health post when our child is sick. Drugs are free and that is good for poor people like us. But it is difficult to carry a sick child from my household. The health post is in [sub-village] which is very far. During rains, I must hire transportation but there are no motorbikes, no bijaj [motorized taxis] to take us. If I carry him [child] I may injure him more. (IDI, mother, Jimma)

In addition, caregivers noted that HEWs were often unavailable, especially during nights and weekends when urgent treatment might be needed. Rural drug vendors, while often perceived as distant and potentially costly, were often seen as more accessible because mothers could request that their husbands travel and did not require the presence of the child. In contrast to these sources, most caregivers mentioned that relatively inexpensive treatments could be secured from herbalists and drug peddlers (at general stores and markets) and were relatively easy and convenient to access.

Many caregivers suggested that they formed these perceptions based on previous child illness experiences. However, the majority also suggested that their lay referral networks were heavily influential in forming and modifying these perceptions. Similar to decisions in preceding stages of care seeking, the decision on where to seek care was also often a socially negotiated process. A caregiver's lay referral network was often instrumental in providing awareness of different provider options, giving treatment

advice and supporting caregivers to overcome access barriers to desired sources of care such as by lending money and assisting with the transport of children.

I give thanks to God for my family and friends. They helped me to get treatments to cure him [child]. I did not know the proper medicines to cure his diarrhea. My husband's elder sister knew where to collect the proper herbs and made them into a tea. After two days he was joli si'a ina qaba. (IDI, mother, Jimma)

On the other hand, some mothers noted contested care and treatment strategies between their own and influential social others' preferences and contested preferences between members of their lay referral network. These mothers often felt pressured into acting first on the preferences of influential social others rather than their own desired care-seeking strategies. Caregivers suggested that elderly family members tended to prefer first trying herbal medicines and *qoricha Oromo* before utilizing other sources. Father informants frequently saw rural drug vendors and, to a lesser extent, drug peddlers as the most effective form of treatment for their child. In other instances, a mother lost control altogether and was actively prevented or felt disempowered from acting on her preferences such as the following mother:

I agreed with my neighbor woman that she [child] needed to go to the health post. I told my husband we must take her to the health post immediately because her fever was increasing. He said to wait and told me to get drugs from the market the next day. I did not want to act against his words but took her to my husband's family. They agreed that I should go immediately to the health post. (IDI, mother, West Hararghe)

As this mother's experience demonstrates, a small number of mothers were able to reassert their preferences by appealing to more senior members of their lay referral networks.

3.6 Use of multiple providers and provider switching

Nearly all caregivers in this study suggested the use of multiple providers over the course of their child's illness. The most common pathways mentioned by IDI informants in this study are given in Table 3. As mentioned, self-treatment, particularly with the use of herbs and assistance of elders was the most common first step of care and treatment. Illicit drug vendors were another form of self-treatment commonly utilized early in the care-seeking process. Use of these sources was regarded as successfully resolving a child illness in more than one-third of illness episodes. For unresolved illnesses, caregivers were increasingly likely to transition to biomedical options such as rural drug vendors and HEWs at the health post as an illness and care seeking progressed. However, concurrent use of sources (often utilizing sources of both *qoricha Oromo* and biomedical drugs) was common throughout care seeking. There were small differences by illness type with caregivers discussing a potential case of fever or respiratory ailment being more likely to utilize drug peddlers, rural drug vendors and accounting for all utilization of traditional and spiritual healers. Caregivers of children with diarrhea were more likely to engage in herbal and *qoricha Oromo* treatments. Finally, those illnesses labeled as *ibidda/cimma* were more likely to lead to the engagement of elders as well as HEWs at the health post.

The decision to utilize more than one source was often based on additional objectives in care seeking for a child. While a return of *jolii si'a ina qaba* was the

primary goal of treatment, a number of secondary objectives of treatments were expressed. These secondary objectives were useful in understanding care-seeking patterns for child illness episodes in this study. Some care sources, especially those used in early care-seeking steps, were also utilized in order to learn more about the illness (e.g. illness label and severity) as caregivers gauged changes in the child's condition in response to treatments. Herbal treatments were commonly utilized for this purpose. Some treatments were used for limited purposes, such as for one particular symptom, rather than aimed at the illness as a whole. Drugs obtained at village shops and marketplaces were common in this regard. Still other treatment sources were used to complement a concurrent treatment such as the use of both traditional herbs and biomedical drugs whereby the former "weakens" the illness or increases the power of the latter. Finally, some treatments, particularly spiritual and traditional healers utilized in later care-seeking steps, were used to cure or prevent *lafu*. One mother suggested a combination of these expectations:

We took him [child] to receive qoricha Oromo from an elder's hand because some in our family suspected he might be weakened by buda nyate ['evil eye']. We also sent my husband to get tijaniya [modern] medicines for the fever and headache. These medicines will work to cure him. (IDI, mother, Jimma)

Evaluations based on both primary and secondary expectations were instrumental in a caregiver's decision to terminate care seeking, continue with the current course of action or switch care providers.

Transitioning between sources was explained by respondents in this study primarily as an attempt to meet the multiple objectives of care seeking and as a response to failure of a provider or treatment in meeting these objectives. When a provider

encounter or treatment course failed to meet caregiver expectations, the majority perceived this outcome as due to the lack of fit between medicines given and the child's illness, particularly in terms of a medicine's power and appropriateness.

Herbs were useless for him [child]. They were too weak but I tried because I could gather them quickly. His breathing was with a 'adu [grunting] and needed stronger medicines. I said he should have an injection for this problem and went to the health post. [The HEW] gave only tablets which were difficult to give and no better than herbs. I discussed with my husband how to get the best treatment for him. (IDI, mother, Jimma)

As this informant suggests, for a caregiver first trying herbal and traditional medicines, failure of these treatment modes often resulted increased receptivity to *tijinaya* medicines, and for those mothers that experienced a failure of biomedical drugs, their child's illness was often seen as requiring more powerful forms of biomedical drugs, particularly injections. For a small number of mothers, failures with biomedical drugs led them to re-consider supernatural causation for their child's illness and to seek traditional remedies.

Treatment failures caused some mothers to consider their personal actions or conflict within their families as responsible for treatment failures. Many women worried that they were or were perceived as "careless mothers" or as "taking incorrect actions," resulting in their child's condition worsening and treatment failures. Some of these women, such as the following mother, outlined in their narratives redressing or contesting this designation by more actively pursuing multiple treatment options:

I did not want to be called careless. I tried everything a mother here can do to here to stop the diarrhea. I went for qoricha Oromo and medicines from the market. I was going to the health post but the women there said [the HEW] was gone for the day. I took her again after two days when it did not stop. I did everything a good mother should for her child. (IDI, mother, West Hararghe)

Others described more active involvement of their lay referral networks, often ceding decision-making and responsibility to other members such as their husbands or mothers-in-law.

Additional reasons given for transitioning to alternate care sources included a caregiver's: dissatisfaction with personal treatment by a provider, appeasement of influential members of a lay referral network, a change in the ability to access a provider or treatment and/or a change in the child's condition or interpretation of a child's illness.

4. Discussion

This study aimed to investigate the context of care seeking for child illness and especially, low rates of use of “appropriate” providers and treatments for sick children. According to much of the literature, policymakers and public health interventions, appropriate sources consist largely of those regulated sources providing evidence-based biomedical drugs. In rural settings, the HEW is the primary mechanism for delivering evidence-based care and treatments for sick children. With recent investments in primary care and child health through the HEP and iCCM strategies, the expectation is that use of HEWs will increase by providing care and treatment in community settings by a trusted and culturally sensitive provider. However, after 10 years of the HEP and two years of

scale up of iCCM, only 10% of sick children are taken to HEWs at health posts for treatment.²⁹⁻³⁰

Uncertainty was a common theme expressed by caregivers throughout the care-seeking process for a sick child. In general, care-seeking was shrouded in uncertainty when it came to finding the correct illness label, identifying the cause(s) of an illness, selecting the right provider and treatment course, mobilizing household resources and capital and, ultimately, the likelihood of recovery.³⁵ The discrepancies and contested nature of illness classification and identification characterizing FGDs in our study suggests that social norms act as only a partial guide to care-seeking behaviors and there is considerable flexibility for individual actions. The distinctions between traditional (*wabiya*) and modern (*tijanaya*) illnesses and providers suggested as normatively guiding treatment choice were often ambiguously portrayed by caregivers in this “new therapeutic landscape” characterized by multiple and “hybrid” providers, with more important distinctions in the ways that caregivers evaluate the salience of different providers to their child’s illness.²⁴ Caregivers in this study sought to minimize uncertainty in a number of ways over the course of a child’s illness such as: “giving a name” to an illness in order to render it understandable in terms of a particular care-seeking course and especially distinguishing whether the illness is severe or mundane child illness;^{13,18,36} enlisting both “laypeople” and “experts” (including hybrid providers such as elders and local shop vendors bridging this divide) to provide social support to decrease uncertainty and enable care seeking;³⁷⁻³⁸ delaying care seeking to learn more about an illness and to increase social support;^{13,39} and utilizing multiple and concurrent sources of care in a trial-and-error process for seeking a cure.^{17,23} Most of these actions

and processes occurred irrespective of the legitimacy of a source as “appropriate” or as a formal biomedical provider.³⁹

A more salient distinction mentioned by several IDI participants in this study was that between those actions that constitute a “good” versus “bad” mother in terms of making socially and culturally acceptable decisions in the care-seeking process for a sick child. According to Alvesson and colleagues, care-seeking decisions reflect the social significance of being a responsible caregiver and showing respect for household and cultural norms.³⁹ A consistent theme across care-seeking decisions and processes was the potential for blame for a child’s illness, worsening condition or the failure of treatments lending a moral dimension to care seeking strategies. The “careless” mother was a common trope in FGDs and many mothers described modifying illness interpretations, engagement of social support and provider and treatment choices to avoid this label in the eyes of the surrounding community. Similarly, the “ignorant” or *wabiya* (often used pejoratively by these informants to denote “traditional”) mother was a common trope in interviews among HEWs and volunteer health workers and caregivers residing near the health post. Some mothers also suggested taking actions to avoid this label by choosing providers (e.g., biomedical) to be recognized as *tijanaya* or providers (e.g., *qoricha Oromo*) that more positively affect their sense of self-worth, trust and community.⁴⁰ The avoidance of these pejorative labels was also seen as affecting the care-seeking process as caregivers took preliminary actions to learn more about their child’s illness and to be able to articulate their child’s condition before presenting their child as a “candidate” for biomedical services.⁴¹

According to Thiede and colleagues,⁴² trust assumes a key position within the transactional process of information exchange, communicative interaction and use of different care providers. Despite the official policy of selection of HEWs from among a local community, this was not always achieved in practice. As well, the requirement of literacy and a relatively high degree of education often meant that an HEW was from the wealthiest strata of a local community. This asymmetrical relation in terms of power and education often led to mistrust of HEWs by caregivers. Although the specific circumstances of this mistrust differed between sites, there were generally caregivers from certain sub-villages within a *kebele* that felt marginalized and excluded from the services of HEWs at the health post due to distance or lower collective social status. The lack of interaction, lack of cultural sensitivity and instances or rumors of an HEW viewing caregivers as “ignorant” often enhanced the degree of mistrust and increased the likelihood of choosing alternative sources. As well, the government of Ethiopia is largely controlled by members of the Tigrayan and Amhara ethnic groups despite the Oromo people constituting a majority of the population of Ethiopia. Consequently, some caregivers in some FGDs suggested a low-level of trust in government-run health programs which were often seen as a way to, in the words of one participant “*control the Oromo people.*” In contrast, informal providers such as elders practicing *qoricha Oromo* and local shop owners were seen as respected and trusted members of a caregiver’s community. Moreover, these providers were linked to the traditions of the Oromo people and considered as one participant stated “*one of us.*”

Illness interpretations and care-giving strategies were a deeply social affair and often developed through ongoing consultation and problem solving within a caregiver’s

lay referral network.^{20,22,37} A mother's husband, mother-in-law, family members and neighbors were influential members of her lay referral network that also assisted in minimizing uncertainties associated with childhood illness and care seeking. Caregivers in this study saw members of their social network as a valuable source of social and financial support and practical advice, but several participants pointed out that this could lead to considerable delays in seeking care and especially from formal sources of care. Consultation with social networks could also potentially challenge to a mother's decision-making ability. For some mothers, autonomy in care-seeking decisions and the potential for blame increased as a child's illness progressed and additional social actors were engaged. This has been found in other studies in sub-Saharan Africa.^{24,43-44} However, many of these mothers suggested the ability to re-assert her preferences by selectively engaging social actors and "experts" within a lay referral network to take desired actions. In our study, we found that the large majority of mothers were open to and even preferred the use HEWs at the health post.

In contrast to other sub-Saharan African settings,⁴³⁻⁴⁴ the influence of gender and power to make household decisions appeared to be less restrictive for mothers as a whole. Most mothers suggested a more collaborative nature or a passive role for husbands, especially during early steps of the care-seeking process. Although a husband's role tended to increase as a child's illness became more severe, required care seeking outside the home and/or required financial resources, most mothers and their husbands described a collaborative relationship with a relatively few instances of husband's withholding resources or prohibiting care seeking outside the home. There appeared to be a significant difference between the two zones with husbands considerably less involved in care

seeking episodes in West Hararghe compared to Jimma though it is not certain why this trend exists.

Another strong theme related to the nature of drugs and treatments received from particular sources. The use of herbal medicines was often rationalized as “strengthening” children, while biomedical drugs were sought for cure.¹⁸ This rationale also helps explain the continuing and often simultaneous use of herbs with biomedical drugs.¹⁷ The power (often related to form) of treatments was another important distinction for caregivers in driving care-seeking strategies. Specific ideas about power and appropriateness of both providers and treatments for a given severity or type of child were seen as influential across provider types. Many studies have found that biomedical drugs, and particularly injections, are perceived as the most powerful form of medicine.^{17,23} However, this study adds nuance to this showing that it does not necessarily follow that they are most appropriate, while herbal medicines also had gradients of power and appropriateness.

Although this was a qualitative study with a limited sample size, the high rates of use of informal providers including informal drug vendors and elders practicing *qoricha* *Oromo* and of using multiple providers challenges findings from quantitative surveys suggesting low use of informal sources and low rates of care seeking from multiple sources. Our findings give some support to Mebratie and colleagues’ hypothesis that caregiver beliefs about childhood illness and preferences for alternative sources of care are important reasons for low use of formal services in Ethiopia.⁴⁵ The majority of caregiver strategies in this study involved use of informal sources of care, similar to findings from qualitative studies in other sub-Saharan African settings.^{23,46} It is likely that stigmatization associated with these sources and the difference in understanding of

categories potentially leads to underreporting of use of these services.⁴⁷ For example, there was widespread use of elders and *goricha Oromo*, which was not always perceived as “traditional medicine.” Consequently, the large role these individuals and treatments, as well as informal drug vendors, played for caregivers in this study are potentially being underappreciated. Similar observations have been made in other studies for elder/providers and informal vendors.^{43,48} It also could lead to the conclusion that caregivers do not leave the household to seek care for sick children. This study found that the majority of caregivers left the household to seek care, often promptly after recognizing symptoms. However, there is a cultural taboo that was observed in most research sites whereby caregivers of very young children did not leave the home for treatment. This has serious implications for newborn care and has been documented in Ethiopia.⁴⁹

5. Conclusion

This paper contributes to this growing body of qualitative research by following the care-giving experiences of rural Ethiopian caregivers from the act of recognizing a child’s illness to household decision-making processes to evaluations of provider and treatment choices. It is essential for existing and future interventions to recognize the dynamic nature of the entire course of care seeking. This includes recognizing the uncertainty inherent in recognition and response to childhood illness, the social nature of care seeking, the burdens and challenges faced by mothers and the continuing popularity and often complementary nature of alternative, community-based sources of care.

References

1. UNICEF. *Committing to Child Survival: A Promise Renewed Progress Report 2013*. New York: UNICEF; 2013.
2. Admassie A, Abebaw D, Woldemichael AD. Impact evaluation of the Ethiopian health services extension program. *Journal of Developmental Effectiveness*. 2009; **1**(4): 430-49.
3. Banteyerga H. Ethiopia's health extension program: improving health through community involvement. *MEDICC Review*. 2011; **13**(3): 46-9.
4. Mariam DH. Bridging the availability-utilization gap: the issue of quality in the provision of health care. *Ethiopian Journal of Health Development*. 2011; **25**(1): 1-2.
5. Central Statistical Agency [Ethiopia], ORC Macro. *Ethiopia Demographic and Health Survey 2011*. Addis Ababa, Calverton: Central Statistical Agency [Ethiopia], ORC Macro; 2012.
6. Schellenberg JA, Victora CG, Mushi A, de Savigny D, Schellenberg D, Mshinda H, et al. Inequities among the very poor: health care for children in rural southern Tanzania. *Lancet*. 2003; **361**(9357): 561-6.
7. Buor D. Analyzing the primacy of distance in the utilization of health services in the Ahafo-Ano South district, Ghana. *International Journal of Health Planning and Management*. 2003; **18**(4): 293-311.
8. Sasaki S, Fujino Y, Igarashi K, Tanabe N, Muleya CM, Suzuki H. Access to a health facility and care-seeking for danger signs in children: before and after a community-based intervention in Lusaka, Zambia. *Tropical Medicine and International Health*. 2010; **15**(3): 312-20.

9. Orem JN, Mugisha F, Okui AP, Musango L, Kirigia JM. Health care seeking patterns and determinants of out-of-pocket expenditure for Malaria for the children under-five in Uganda. *Malaria Journal*. 2013; **12**: 175.
10. Rutherford ME, Dockerty JD, Jasseh M, Howie SR, Herbison P, Jeffries DJ, et al. Access to health care and mortality of children under 5 years of age in the Gambia: a case-control study. *Bulletin of the World Health Organization*. 2009; **87**(3): 216-24.
11. Kroeger A. Anthropological and sociomedical health care research in developing countries. *Social Science and Medicine*. 1983; **17**(3): 47–161.
12. Mackian S, Bedri N, Lovel H. Up the garden path and over the edge: where might health-seeking behavior take us? *Health Policy and Planning*. 2004; **19**(3): 137-46.
13. Ryan GW. What do sequential behavioral patterns suggest about the medical decision-making process?: Modeling home case management of acute illnesses in a rural Cameroonian village. *Social Science and Medicine*. 1998; **46**(2): 209-25.
14. Kleinman A. *Patients and Healers in the Context of Culture*. Berkeley: University of California Press; 1980.
15. Kleinman A., Eisenberg L., Good B. Culture, illness, and care: clinical lessons from anthropological and cross-cultural research. *Annals of Internal Medicine*. 1978; **88**(2): 251-88.
16. Kamat VR, Nyato DJ. Community response to artemisinin-based combination therapy for childhood malaria: a case study from Dar es Salaam, Tanzania. *Malaria Journal*. 2010; **9**: 1-9.
17. Nyamongo IK. Health care switching behaviour of malaria patients in a Kenyan rural community. *Social Science and Medicine*. 2002; **54**(3): 377-86.

18. Friend-du Preez N, Cameron N, Griffiths P. Stuips, sputis and prophet ropes: the treatment of abantu childhood illnesses in urban South Africa. *Social Science and Medicine*. 2009; **68**(2): 343-51.
19. Bakeera SK, Petzold M, Pariyo GW. Community social capital and the use of health care services in Uganda. *Journal of Public Health and Epidemiology*. 2010; **2**: 189-98.
20. Scott K, McMahon S, Yumkella F, Diaz T, George A. Navigating multiple options and social relationships in plural health systems: a qualitative study exploring healthcare seeking for sick children in Sierra Leone. *Health Policy and Planning*. 2013; [Epub ahead of print].
21. Pokhrel S, Sauerborn R. Household decision-making on child health care in developing countries: the case of Nepal. *Health Policy and Planning*. 2004; **19**(4): 218-33.
22. Berman P, Kendall C, Bhattacharyya K. The household production of health: integrating social science perspectives on micro-level health determinants. *Social Science and Medicine*. 1994; **38**(2): 205-15.
23. Colvin CJ, Smith HJ, Swartz A, Ahs JW, de Heer J, Opiyo N, et al. Understanding careseeking for child illness in sub-Saharan Africa: A systematic review and conceptual framework based on qualitative research of household recognition and response to child diarrhea, pneumonia and malaria. *Social Science and Medicine*. 2013; **86**(1): 68-78.
24. Leach MA, Fairhead JR, Millimouno D, Diallo AA. New therapeutic landscapes in Africa: Parental categories and practices in seeking infant health in the Republic of Guinea. *Social Science and Medicine*. 2008; **66**(10): 2157-67.

25. Deressa W. Treatment-seeking behavior for febrile illness in an area of seasonal malaria transmission rural Ethiopia. *Malaria Journal*. 2007; **6**(1): 49.
26. Deressa W, Ali A, Berhane Y. Household and socioeconomic factors associated with childhood febrile illnesses and treatment seeking behavior in an area of epidemic malaria in rural Ethiopia. *Transactions of the Royal Society of Tropical Medicine and Hygiene*. 2007; **101**(9), 939-47.
27. Assefa T, Belachew T, Tegegn A. Mothers' health care seeking behavior for childhood illnesses in Derra District, Northshoa Zone, Oromia Regional State, Ethiopia. *Ethiopian Journal of Health Sciences*. 2008; **18**(3): 87-94.
28. Fantahun M, Degu G. Health service utilization in Amhara region of Ethiopia. *Ethiopian Journal of Health Development*. 2003; **17**(2): 141-7.
29. Mela Research, PLC. *Baseline Coverage Survey for the Independent Prospective Evaluation of the Integrated Community Case Management (ICCM) in Oromia Region, Ethiopia: Draft Report*. Addis Ababa: Mela Research, PLC; 2011.
30. The Last Ten Kilometers Project (L10K). *Changes in Maternal, Newborn and Child Health in 115 Rural Woredas of Amhara, Oromia, SNNP and Tigray Regions of Ethiopia, 2008-2010: Findings from the L10K baseline and midterm surveys*. Addis Ababa: John Snow International (JSI) Research and Training Institute, Inc.; 2012.
31. Pelto PJ, Pelto GH. Studying knowledge, culture and behavior in applied medical anthropology. *Medical Anthropology Quarterly*. 1997; **11**(2): 147-63.
32. Scrimshaw S, Hurtado E. *Rapid Assessment Procedures for Nutrition and Primary Health Care: Anthropological Approaches to Improving Program Effectiveness*. Tokyo: United Nations University; 1987.

33. Garro LC, Mattingly C. Narrative as construct and construction. In Garro LC, Mattingly C, eds., *Narrative and the Cultural Construction of Illness and Healing*. Oakland: University of California Press, 1-49; 2000.
34. Charmaz K. *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*. Thousand Oaks: Sage Publications; 2006.
35. Whyte SR. *Questioning Misfortune. The Pragmatics of Uncertainty in Eastern Uganda*. Cambridge: Cambridge University Press; 1997.
36. Young JC. *Medical Choice in a Mexican Village*. New Brunswick: Rutgers University Press; 1981.
37. Janzen JM. *The Quest for Therapy: Medical Pluralism in Lower Zaire*. Berkeley: University of California Press; 1978.
38. Sauerborn R, Adams A, Hien M. Household strategies to cope with the economic costs of illness. *Social Science and Medicine*. 1996; **43**(3): 291-301.
39. Alvesson HM, Lindelow M, Khanthaphat B, Laflamme L. Coping with uncertainty during healthcare-seeking in Lao PDR. *BMC International Health and Human Rights*. 2013; **13**: 28.
40. Ricketts TC, Goldsmith LJ. 2005. Access in health services research: the battle of the frameworks. *Nursing Outlook*. **53**(6): 274-80.
41. Dixon-Woods M1, Cavers D, Agarwal S, Annandale E, Arthur A, Harvey J, et al. Conducting a critical interpretive synthesis of the literature on access to healthcare by vulnerable groups. *BMC Medical Research Methodology*. 2006; **6**: 35.
42. Thiede M. Information and access to health care: is there a role for trust? *Social Science and Medicine*. 2005; **61**(7): 1452-62.

43. Tolhurst R, Nyongato FK. Looking within the household: gender roles and responses to malaria in Ghana. *Transactions of the Royal Society of Tropical Medicine and Hygiene*. 2006; **100**(4): 321-6.
44. Ellis AA, Winch P, Daou Z, Gilroy KE, Swedberg E. Home management of childhood diarrhea in southern Mali: implications for the introduction of zinc treatment. *Social Science and Medicine*. 2007; **64**(3): 701-12.
45. Mebratie AD, Van de Poel E, Yilma Z, Abebaw D, Alemu G, Bedi AS. Healthcare-seeking behaviour in rural Ethiopia: evidence from clinical vignettes. *BMJ Open*. 2014; **4**(2): e004020.
46. Sudhinaraset M, Ingram M, Lofthouse HK, Montagu D. What is the role of informal healthcare providers in developing countries? A systematic review. *PLoS One*. 2013; **8**(2): e54978.
47. Ansah EK, Powell-Jackson T. Can we trust measures of healthcare utilization from household surveys? *BMC Public Health*. 2013; **13**: 853.
48. Rutebemberwa E, Nsabagasani X, Pariyo G, Tomson G, Peterson S, Kallander K. (2009). Use of drugs, perceived drug efficacy and preferred providers for febrile children: implications for home management of fever. *Malaria Journal*. 2009; **8**: 131.
49. Callaghan-Koru JA, Seifu A, Tholandi M, de Graft-Johnson J, Daniel E, Rawlins B, et al. Newborn care practices at home and in health facilities in 4 regions of Ethiopia. *BMC Pediatrics*. 2013; **13**: 198.

Table 1: Characteristics of selected *kebele* sites

	Woreda	Utilization^a	Distance to referral facility (in km)	Catchment size (in square km)	Number of functional HEWs
<i>Jimma</i>					
Site 1	Goma	Low	23	16	1
Site 2	Omo Nada	Medium	8	9	2
Site 3	Shebe Seneba	Medium	31	20	2
Site 4	Kersa	High	10	8	3
<i>West</i>					
<i>Hararghe</i>					
Site 5	Oda Bultum	Low	5	10	1
Site 6	Gemechis	Medium	3	17	2
Site 7	Boke	Medium	25	42	1
Site 8	Boke	High	13	21	1

Source: Miller N. *Integrated Community Case Management of Childhood Illness in Ethiopia: Implementation Strength and Quality of Care*. Dissertation Report. Baltimore: Johns Hopkins University; 2013.

^aLow: 0-10 sick child consultations/month; medium: 10-40; high: >40

Table 2: Sample size by method

<i>Technique, Population</i>	Per site	Total (for all sites)
FGD, Mothers	2 (6-12 individuals)	16 (132 individuals)
IDI, Mothers	4-6	40
IDI, Fathers	2	16
IDI, HEWs	1-2	10
IDI, Volunteer/HDA ^a	1-2	12
<i>Total</i>	<i>10-14</i>	<i>94</i>

^a Volunteer community health worker and/or member of the Health Development Army

Table 3: Care-seeking pathways followed by two or more caregivers (presented in order of frequency)

1.	Home treatment → Traditional healer
2.	Home treatment only
3.	Home treatment → Informal drug vendor
4.	Home treatment → Traditional healer → Informal drug vendor
5.	Home treatment → Traditional healer → Health post
5t.	Home treatment → Health post
7.	Home treatment → Traditional healer → Health post → Traditional healer
7t.	Home treatment → Health post → Health center
9.	Traditional healer → Informal drug vendor → Health center
9t.	Traditional healer → Health center → Traditional healer
9t.	HEW only

Paper 2: Barriers to access of integrated community case management of common childhood illnesses: Perspectives and experiences of caregivers in rural Ethiopia

1. Introduction

Integrated community case management (iCCM) of common childhood illnesses is an increasingly popular strategy for delivering evidenced-based, child health interventions to underserved communities through appropriately trained, equipped and supervised community health workers (CHWs). The strategy is supported by a broad range of global institutions and is currently being adopted and scaled up in many low-income nations to improve access and meet Millennium Development Goal-IV (MDG-IV).¹ However, iCCM is a complex, multi-leveled and multi-step approach, and progress in implementation and scale-up at the national level faces considerable challenges.²⁻⁴

Despite increasing documentation of these challenges,⁵ there is an insufficient understanding of implementation factors that lead to successful scale up of iCCM programs.⁶ According to Hanson et al.⁷ and others,⁸⁻⁹ successful scale up depends on two interrelated facets of access: 1) extending health services, a supply-side intervention facilitating availability of services; and 2) promoting their utilization, a demand-side intervention facilitating the use of these services by those that need them. Of these two facets, actions to date have been primarily directed at addressing supply-side challenges.^{8,10} Although significant gains are being made in several settings in improving availability and quality of services, corresponding gains in utilization of services by intended beneficiaries often remains suboptimal¹¹ and unequal.¹²

Evidence suggests that demand-side factors are important determinants of utilization, yet their contributions to observed low levels of utilization are poorly understood.^{8,13} This gap in understanding occurs despite a prominent position of demand in iCCM and integrated management of childhood illness (IMCI) intervention models.¹⁴⁻¹⁵ In many national iCCM intervention models, “community communication and mobilization” activities relevant to national and cultural contexts are expected to occur in conjunction with and to stimulate community demand for child health services.¹⁶ However, the implementation and content of these activities is rarely examined. As a result, countries scaling up iCCM services are left with few concrete guidelines for identifying barriers to access of iCCM services and designing relevant demand-generation activities. Furthermore, the pressures of scaling up and meeting international health targets often lead to selective focus on better understood supply-side interventions limiting the full potential of the iCCM intervention package.^{9-10,17}

At this juncture, it is critical to explore potential determinants of low utilization of CHWs delivering iCCM services. Caregivers face myriad challenges in accessing child health services, and their perceptions and experiences yield significant insights into observed patterns of utilization.¹⁸ Cost and distance are the most frequently explored barriers, but these barriers are expected to be minimized in the context of iCCM where free or low-cost services are provided closer to caregivers’ households. A fuller understanding of the dynamics of these and remaining barriers accounting for low utilization of CHWs providing iCCM services is a necessary step towards the establishment of a comprehensive iCCM intervention package that attends to both supply- and demand-side barriers to access.

This study fills this knowledge gap by qualitatively exploring the experiences and perspectives of caregivers of sick children, including both facilitators and barriers to the utilization and demand for iCCM services. It was conducted in rural Ethiopia, at a time and in a setting where health extension workers (HEWs) have been implementing iCCM for two years. The findings of this research are also directly applicable to the early stages of the rollout of the Health Development Army (HDA), a national initiative to train one woman in every five households to model positive health behaviors in her community. This initiative holds considerable potential to stimulate additional demand for iCCM services.

1.1 Access to health services

Access to effective care is a central concern of government stakeholders working to achieve the health-related MDGs.¹⁹ Despite this concern, there is no consensus on what access to healthcare means, and there is considerable ambiguity about the concept's usage.²⁰ Penchansky and Thomas's²¹ definition of access as a "fit" between those seeking health services and health services themselves is commonly used in health systems research. According to these authors, access has four dimensions: availability, geographic accessibility, affordability and acceptability.²¹⁻²² *Availability* consists largely of the presence of qualified health providers and quality health commodities at a health post. *Geographic accessibility* relates to the spatial or geographic relationship between providers and users of health care. *Affordability* is the financial ability of a user to access care. *Acceptability* relates to attitudes of users of health care toward providers and services.^{21,23} These dimensions address factors occurring at the supply- and demand-side levels and interactions between these levels.^{8,13,22,24-25}

Existing research on access has been criticized for focusing predominantly on financial and geographic barriers to accessing health services, and ignoring the potential contributions of social networks and culture.^{18,22} It has also been criticized for only superficial exploration of the reasons why health care is not utilized and which groups have poor access, or the relative importance of various access factors.¹⁸ This study uses Rutherford et al.'s¹⁸ modification of the Petchansky and Thomas Framework,²² which expands the four dimensions to include and exploration of the role of social networks, female autonomy and time availability in impeding or facilitating access.¹⁸ The study's qualitative design allows a more in-depth exploration of the influence of these factors on access to child health services.

1.2 Study setting

Ethiopia has made considerable gains in reducing under-five mortality over the previous two decades, having recently achieved MDG-IV for reducing child mortality by two-thirds since 1990.²⁶ Many of these gains are a result of significant increases in coverage of child health interventions.²⁷⁻²⁸ Despite this success, approximately 321,000 under-five children continue to die in Ethiopia every year, many from preventable diseases such as diarrhea, malaria and pneumonia.²⁹ Although coverage of child health interventions is steadily increasing, utilization of formal health services and use of correct treatments for diarrhea, malaria and pneumonia remain low (Table 1).³⁰ These rates have also been found to be significantly lower than neighboring countries.³¹ Utilization of HEWs for these illnesses has been found to be very low, ranging from four to 17% and varying by illness and region.³²⁻³³

In 2004, the Ethiopian Federal Ministry of Health began rolling out the Health Extension Program (HEP), which included the deployment of health extension workers (HEWs) for provision of 17 essential health services in four priority health areas: 1) family health; 2) disease prevention and control; 3) hygiene and environmental sanitation; and 4) health education and communication. The core of the HEP involved the construction of over 15,000 rural health posts at the lowest administrative level, the *kebele*, which typically includes a catchment area of 5,000 individuals. Ideally, two local, educated women are trained, deployed at each health post and paid for their services. Since 2004, over 30,000 HEWs have been trained and deployed and the role of HEWs has been expanded to include community case management of diarrhea, malaria and malnutrition for children under the age of five. With the inclusion of pneumonia in 2010, HEWs have now been trained, deployed and are currently delivering iCCM services throughout much of the country.³⁴

In an effort to expedite the achievement of the MDGs and to supplement both the HEP and iCCM initiatives, Ethiopia began rolling out the Health Development Army (HDA) in 2012. The HDA is a new cadre of community health volunteers consisting of one woman per every five households. These community health volunteers are selected by HEWs to demonstrate model health behaviors to households in their social network. Although the role of the HDA is evolving, they are expected to contribute to the HEW's community mobilization and education activities as part of existing national child health initiatives, as well as to promote community engagement and program sustainability.³⁵

The majority of existing studies on care seeking for common childhood illnesses in Ethiopia occurred prior to the implementation of iCCM and HDA initiatives.³⁶⁻⁴⁰ The

current research seeks to explore care seeking in the context of the scale up of iCCM and the initial implementation of the HDA. Occurring at this policy juncture, it will help identify factors influential in the utilization of iCCM services and potential contributions for both HEWs and the HDA in increasing utilization of child health services.

2. Methods

Qualitative research was conducted as part of a series of studies evaluating Ethiopia's scale-up of iCCM in the Oromia region. Data collection was conducted for 30 days from December 2012 to January 2013. Eight rural *kebele*^{§§} sites, each corresponding to one health post catchment area servicing approximately 5,000 people, were selected purposively from sites where iCCM implementation and scale-up had been occurring for at least 18 months in the predominantly rural zones of Jimma and West Hararghe. Purposive selection was based on existing information about health post utilization obtained from a quality of care survey conducted four months prior to the qualitative study. Sites were selected to achieve maximum variation for this factor of health post utilization.⁴¹ Table 2 presents key characteristics for selected *kebele* sites.

The study design was informed by rapid ethnographic assessments developed as part of applied anthropological research methods for child health and care-seeking behaviors.⁴²⁻⁴³ One team of four college-educated, Afan Oromo-speaking investigators with experience in qualitative research methods were trained and conducted the research supervised by the primary author. Qualitative methods consisted of focus group discussions (FGDs) and in-depth interviews (IDIs). Follow recommendations of Pelto and Pelto,⁴³ FGDs focused on social norms of care seeking and community perceptions of

^{§§} A *kebele* is the lowest administrative unit, followed by *woredas* (districts), zones and regions.

HEWs and health post services; IDIs focused on care-seeking experiences during the most recent child illness, including perceptions relating to barriers and facilitators to utilizing the health post.

All mothers of children under the age of five within a *kebele* were listed with the assistance of community leaders, volunteer community health workers and members of the HDA. Mothers of a child under the age of five who were over the age of 18 and speaking Afan Oromo or Amharic were eligible for selection for FGDs. HEWs were asked to stratify lists into mothers who had ever used the health post for a sick child and mothers who had never used the health pots. FGDs were stratified by these two groupings and participants were randomly selected from these lists. Members of the HDA networks identified mothers who had experienced a child illness over the previous month. Initially, these women were randomly selected (and screened for verification) for IDIs. At later stages, theoretical sampling did occur to ensure the capturing of certain perspectives such as distance of the household from the health post and caregiver and child age.⁴¹ Local guides and members of the HDA assisted in the recruitment of selected participants.

Sixteen FGDs were held and were stratified into eight with mothers who were identified as previously using health posts for child illnesses and eight with mothers identified as never using health post services. Forty IDIs were held with mothers of children under the age of five screened for having experienced a child illness over the previous month. For additional context, 16 IDIs were held with a subset of these women's husbands and 22 IDIs were held with HEWs and volunteer community health workers (VCHWs). Table 3 provides the sample size for each site and the total sample. All research interactions were conducted in Afan Oromo and with verbal consent.

The primary author conducted daily debriefing sessions with investigators to discuss key findings, determine saturation of themes and refine data collection. FGDs and IDIs were audio-recorded and transcribed into English. Selected segments of transcripts were back translated to assess quality of translation. The primary author analyzed data using Atlas.ti software (Development SS, Berlin). Hierarchical codes were created after reading through a sub-sample of transcripts by the primary investigator and validated by independent analysts. *A priori* codes were also included based on Penchansky and Thomas's²¹ and Rutherford et al.'s¹⁸ access frameworks. All transcripts were then coded for thematic analysis. During analysis, data were compared across sites, methods and participant groups to triangulate findings. Constant comparative analysis was used to identify similarities and differences within these themes and between groups of women who used health post services and women who did not use health post services as well as additional relevant factors such as distance.^{41,44}

The study received ethical approval from the Oromia Region Health Bureau and Johns Hopkins Bloomberg School of Public Health.

3. Results

3.1 Awareness

The majority of participants in this study were aware of the location of the health post and identity of at least one of the HEWs assigned to the health post. Many mothers who had not previously used the health post and a large number of fathers, however, were unaware of or uncertain about the availability of treatments for common child illnesses, especially for pneumonia. When discussing HEW's roles within the community in FGDs,

participants commonly mentioned the provision of child immunization, antenatal, water and sanitation and family planning services.

We name [the HEW] ‘latrine people’ here. That is what we see them doing in our village. (FGD, mothers, health post (HP) non-users, Jimma)

The availability of treatment for child illnesses at the health post was recognized explicitly in only three of the eight FGDs conducted with participants that did not utilize health post services.

Mothers who did not use health post services did report some contacts with HEWs through community health meetings, and they often viewed the HEW’s provision of health education in a positive light. However, many were unable to recall whether the HEW or VCHW discussed the availability of testing and treatment for child illnesses at the health post, especially for pneumonia, reflecting limited recognition of the availability of treatments for child illness.

[The HEW’s] role is to conduct many meetings to teach us proper health practices.
(FGD, mothers, HP non-users, Jimma)

Most of the women also stated that the HEW or a VCHW had not visited their household over the previous year.

3.2 Availability

HEWs and caregivers both noted that HEWs were often absent from the health post during established working hours (8am – 6pm). This was especially problematic at three of the eight research sites that only had one functioning HEW at the time of the research encounter. At these sites, HEW informants stated that they might be absent for trainings, outreach activities and personal reasons, leaving the health post unstaffed. They

also reported that they were forced to make difficult tradeoffs in terms of time spent on outreach activities within the community and time spent staffing the health post. Three of these understaffed sites were also among those selected with low overall utilization of health post services.

For those mothers that did, ultimately, take their child to the health post, the absence of the HEW from the health post was listed as one of the primary barriers to receiving prompt treatment.

[The HEW] is very hard working, but she is only one woman. She cannot treat all the children here who need it. This is the big problem here that must be corrected. (FGD, mothers, HP users, W.(est) Hararghe)

Many informants stated that they had experienced at least one visit to the health post in which the HEW absent and encountered long waiting periods for the HEW to return. Although some delayed care-seeking actions until the HEW returned and the caregiver found time to return to the health post, others opted to try informal treatment options.

I carried my child twice to the health post over two days. It was closed and the local women said the HEW was at a meeting in [urban center]. I did not return for a third day. I went to the market to get medicines instead. (IDI, mother, HP non-user, W. Hararghe)

Like this mother, some of these women never returned to the health post later, with many suggesting that such experiences would be influential in decisions to seek care at the health post in future child illness episodes. In addition to the absence of the HEW from the health post during working hours, several mothers also viewed the working hours of

the health post as inconvenient and as a significant barrier to the utilization of the health post.

We were not concerned when her [the child] fever was low during the day. Her fever worsened through the night and we did not wait for the health post to open to get medicines. We took her to get medicines in [urban center]. (IDI, mother, HP non-user, Jimma)

Similar to this mother, several caregivers noted that their children's condition often worsened at night or on the weekend when the health post was closed, forcing them to seek alternative and often, costly care options.

Some mothers also related experiences in which the health post or HEW did not have necessary tests or medications for their children.

They tell us to go to the health post but what can they do for our children if they have no medicines? (FGD, mothers, HP non-users, Jimma)

However, the majority of these experiences were from more than one year ago and there was a general recognition among users of health post services that the availability of treatments and supplies at health posts had improved in recent periods. Nevertheless, some informants stated that they no longer went to the health post due to a previous experience and lingering perceptions about the lack of supplies.

Several participants noted that they relied on social networks to inform them about the availability of the HEW and medicines at the health post on a given day. Two HEWs also stated that they commonly wrote messages on the health post door, and designated VCHWs or women near the household to communicate their absence to community members seeking care and treatment.

3.3 Affordability

Most mothers involved in this study recognized that services provided by HEWs were free to their children under the age of five. This was often regarded as a major facilitator to using health post services over other sources of care and treatment. However, although a small number of caregivers were unaware of the provision of treatments for child illness, a somewhat larger number of mothers who did not use health post services tended to be less likely to be aware of free services or did not fully trust that a visit to the health post would not incur some direct costs for testing or treatment.

P₁: We suspect [the HEW] of holding the best treatments so she can earn money.

P₂: Do not listen, this is ignorant. [The HEW] is trustworthy and would not do such practices. (FGD, mothers, HP non-users, Jimma)

Despite this perception and a few mentions of rumors or conflicting messages as in the discussion above, no participant mentioned any actual experience of an HEW asking for money when providing services for children under the age of five.

In contrast to direct costs of services, the majority of caregivers noted indirect costs associated with visiting the health post.

We provide free medicines, but for many women in our community, that is not enough. For mothers who live over there [distant from health post], they travel great distances and must hire transport. Their husbands hold all the money...they might scold them for not doing work and many women must beg money to come to the health post. (IDI, VCHW, W. Hararghe)

For most, this involved costs of transporting a child from the household to the health post. This could be a significant expense, especially for households distant from the

health post or in emergencies. For others, leaving field or domestic work to seek care represented a significant opportunity cost associated with visiting the health post. A small number also expected that a visit to the health post would result in an expensive referral to the urban health center, often based on past experience.

A few mothers stated that they routinely set aside small amounts of money, some times without the knowledge of their husbands, for unexpected child health expenses. Others mentioned that they were able to procure loans or help with domestic activities during their absence from family and friends.

3.4 Geographic access

Distance to the health post, poor village pathways and road conditions and inadequate transport were commonly cited obstacles to the use of health post services. Conditions were particularly challenging during the rainy season and at sites characterized by difficult terrain. Participants frequently mentioned a lack of transport options and difficulties in carrying children long distances to and from the health post without assistance.

I did not visit the health post because it is too far from our household and I could not have my child walk. If I could find a motorbike, I would take my child but there are none. (IDI, mother, HP non-user, W. Hararghe, 60 mins. from HP)

Geographic barriers were the most commonly mentioned challenge for those participants residing further than 45 minutes-walk from the health post. Nevertheless, some participants residing at distances further than a 45 minute walk did use health post services. These participants mentioned that the availability of free and high quality

services at the health post and the seriousness of their child's condition outweighed concerns about distance.

It is a long and difficult walk, but we want the best medicines for our children. (FGD, mothers, HP users, W. Hararghe, 75 mins. from HP)

In the face of these challenges, most participants not using the health post resorted to informal sources of treatment that are located closer to their household such as elders, herbalists and illegal drug vendors. Some explicitly preferred these sources as more convenient. However, there were a number of caregivers who stated a preference for health post services and coped with geographical barriers by opting for informal sources instead. Those informants who used the health post mentioned several means of coping with physical accessibility challenges. Mothers mentioned enlisting husbands and family members to help carry sick children and at one high-utilization site, FGD members stated that they had actively lobbied village leaders to mobilize community members in clearing village paths and organizing transportation to the health post. Two HEWs also stated that they had occasionally provided services to children in their households rather than relying on their caregivers to bring them to the health post.

3.5 Ownership of the health post

At most research sites, the health post served a collection of sub-villages organized under one *kebele*. At some sites, the location of the health post within a particular sub-village was linked to perceptions of community ownership of the health post and services.

Children in our village no longer die from their illnesses. We are happy that our village now has modern medicines. (FGD, mothers, Jimma, HP users)

In contrast, caregivers from other, often distant, sub-villages gave responses that suggested feelings of exclusion from the services available at the health post. At the same site in Jimma as the previous participant, another mother in an FGD for those that did not use health post services stated:

That health post is not for us [mothers from a sub-village approximately 45 minutes by foot]. Nobody in our village goes there because the HEW does not treat us well.

(FGD, mothers, Jimma, HP non-users)

In addition to geographic placement of the health post, perceptions of ownership were also reinforced by HEW attitudes, practices and interactions with caregivers. Several HEWs pointed out areas and populations (often geographically based) that they had difficulties reaching or that villagers actively avoided in outreach activities.

3.6 Acceptability

For many caregivers, their acceptability of health post services depended largely on the HEW attitudes, practices and interactions with them. The majority of those that used health post services held generally positive views of the HEW. However, at two research sites, nearly all caregivers interviewed had negative views; one due to the HEW's leaving a village to live in an urban center and frequent absences from the community and health post and another due to reports of an HEW's negative attitudes in interactions with caregivers as well as on-going conflict with community leaders.

Quite a few of those mothers who did not use the health post reported negative views about the HEW. These negative perceptions were sometimes based on previous experiences but were more often influenced by the perception or experiences of other family and community members.

[The HEW] thinks we are ignorant and do not care for our children. My sister said she was called a bad mother and that the HEW would not treat me with respect. (IDI, mother, Jimma, HP non-user)

Caregivers frequently perceived that HEWs held views of them or other sub-populations within their *kebele* as: “ignorant,” “uneducated,” “traditional” and “bad mothers.” The HEWs themselves often used these terms in interviews when describing areas or populations who did not utilize the health post and/or were perceived as having more child illness and deaths.

Mothers in [population in a distant sub-village] are uneducated and hold traditional views of medicine. They do not accept our teachings and use herbs and religious treatments rather than come to the health post for modern medicines. That is why more children there are sick. (IDI, HEW, Jimma)

Caregivers also noted that communication was frequently difficult or strained. They reported that HEWs did not value or address their health beliefs, scolded them for delaying treatment or using other sources of care and spent little time in answering their questions or educating them about their child’s condition and treatment options.

I did not tell [the HEW] of the herbs I have given my child. The elders say this is our tradition, but she will not agree and tell us this is bad for our child. How can this be bad for our child? (IDI, mother, Jimma, HP user)

The data also suggested that reported acceptability of HEW and health post services related to expectations of receiving a tangible treatment or characteristics of the treatments received. Most mothers expected a visit to the health post to result in provision of a diagnosis and drug. Many caregivers recounted previous experiences when a visit to

the health post did not result in either. Others recounted experiences in which they received medicines that were perceived as inappropriate. Some stated that the medicines given were too weak or difficult to administer (e.g., oral rehydration salts and tablets).

I did not go to the health post for this child. [The HEW] will only give tablets. I must break it up to convince my child to take the medicine. Even my husband will have difficulties getting her to take these medicines from the health post. (IDI, W.

Hararghe, HP non-user)

Others, especially mothers of very young children, perceived that medicines were too strong (e.g., syrups and injections) for their child and would cause harm. A small number did not trust that the HEW was not withholding the best medicines from their children because they delayed treatment or they were from another sub-village.

Finally, a large number of mothers who did not use the health post suggested that “modern medicines” were not appropriate for a range of symptoms and illnesses. Certain types of diarrhea, fever and respiratory problems were perceived as being caused by spiritual or moral causes, and therefore not amenable to treatment at the health post. This was especially common for illnesses in very young children and was reinforced by a cultural proscription on a mother and child leaving the household for 40 days after birth.

The most common response to acceptability barriers and constraints related to the HEW and health post was to seek alternative sources of care within the community or nearest urban center. A few mothers in FGDs stated that they had taken their concerns to community leaders with varying degrees of response.

3.7 Social networks

The majority of mothers who used the health post reported a large and diverse range of social actors sought for advice and support in care-seeking decisions. Although husbands and mothers-in-law were central actors in decision making, informants often stated that they became aware of the availability of child health services at the health post through conversations with sisters and sisters-in-law and neighbors with young children. Many suggested active social engagement with VCHWs, women in the HDA network, and HEWs, and participation in community health meetings. For those living in sub-villages distant from the health post, social networks were often regarded as key influences in their decision to utilize the health post despite geographic barriers.

I thank my neighbor for telling me about the medicines at the health post. He is my only child and I worry about taking the proper steps in caring for him when he is sick. I will tell any mother who asks to take their child there and educate themselves in meetings. (IDI, mother, HP user, W. Hararghe, 60 mins. from HP)

In addition to making caregivers aware of health post services and encouraging utilization, these social actors commonly assisted in identifying an illness, its severity and a course of action. In other cases, members of a social network provided help in carrying children and arranging transport, and in watching children and assisting in domestic activities to help facilitate a visit to the health post. In a small number of instances, neighbors, peers and even community leaders were enlisted to help overcome resistance to utilizing the health post on the part of husbands and family members.

For many informants who did not use the health post over the course of their child's illness, caregivers commonly described a social network more restricted to the

immediate household and a limited range of close family members relative to health post users, as suggested by the following husband-wife pair:

It was only discussed [child's illness] with my husband and his family. Only they know the proper conduct. (IDI, mother, HP non-user, Jimma)

It is my wife's duty to watch over the children, but when her [child's] condition is serious it is only the family that knows what to do. (IDI, father, HP non-user, Jimma)

Although many of these mothers expressed an openness or desire to use the health post, husbands and mothers-in-law were seen as key gatekeepers and often constrained this preference. In the absence of social support to overcome this resistance and other barriers, these women were unable to take their child to the health post.

Other caregivers who did not use the health post suggested that they had been influenced by negative perceptions or mistrust of the HEW or health post by key members of their social networks. Many who first went to informal sources of care were often dissuaded from seeking care by these providers, but informal providers were also mentioned as referring mothers to the health post when their treatments failed to cure the child.

3.8 Female autonomy and decision making

For most participants in this study, decisions about when and where to seek care were the result of negotiation between multiple members of a household and community, rather than simply an individual caregiver determining a course of action on her own. Although child care was commonly seen as the domain of the mother, in FGDs, most participants endorsed the view that it was a woman's duty to consult her husband and

family members before making care-seeking decisions for her child. These gatekeepers were described as both facilitators and barriers to seeking care from the health post.

Some mothers suggested that they had a high degree of control over decision making for their child, especially in the initial stages of an illness when symptoms were well understood and treatment seeking incurred little financial cost. In their care-seeking narratives, many mothers suggested that they immediately took their children to informal sources of care or the health post without first seeking advice from others within their household upon recognition of symptoms.

I did not want to burden my husband. He was in the fields and would agree that taking him [child] to the health post is correct. (IDI, mother, HP user, Jimma)

For those using the health post, women tended to live close to the health post, believed that their family would support their decision and have social linkages to the HEW.

When a child's illness progressed, the remaining mothers who used the health post stated that they first discussed treatment seeking outside the home with their husbands and family members. Most suggested that they felt their own desires and preferences were considered and valued when making decisions. When speaking of this decision making process, one FGD participant stated:

Our relationship is a good one of respect and learning. Some mothers-in-law fight with their daughters and husbands fight with their wives, but we see this less. We will take what is good in their advice. (FGD, mothers, HP users, W. Hararghe)

However, many who preferred to use the health post encountered some resistance from their husbands or family members who had negative perceptions of HEWs or health post services, preferred delaying care or advised seeking treatment from informal sources.

My husband did not believe his [child's] condition was severe. He bought medicines at the local shop. We waited and after his condition worsened, my husband allowed me to visit the health post. (IDI, mother, HP user, W. Hararghe)

For many caregivers who desired to use health post services but who did not do so, this pressure and lack of decision making power and support was often too strong to overcome. In two cases, informants stated that husbands or family members actively withheld financial resources and other forms of assistance, and another two women stated that their movement was restricted to the household making utilization of the health post impossible.

3.9 Time availability

FGD participants noted that mothers and women in rural Ethiopia have a number of family and subsistence responsibilities critical for the smooth functioning of a household.

You must understand; women here must attend to the needs of all their family. (FGD, mothers, Jimma, HP-users)

In their care-seeking narratives, several mothers stated that a child's illness made it difficult to balance the demands of attending to this child and fulfilling their household responsibilities. Mothers with a large number of children or dependents often felt they were neglecting their other children, especially for a prolonged illness in one of their children. Mothers who lived distant from the health post often stated that they ultimately chose alternative sources nearer their homes and stated that they did so because of the time convenience.

If I took my child to the health post, it would take three or four hours. I went to the village shop where I could get medicines in less time. (IDI, mother, W. Hararghe, HP non-user)

Some IDI informants who did not use the health post over the course of their current child's illness stated that they had taken their children to the health post in the past. For various reasons related to demands on their time, they were unable to do so for their child's most recent illness. Several of these mothers mentioned that increased time demands related to planting and harvesting prevented them from using the health post. Many, but not all, mothers stated that they were often able to overcome this constraint by enlisting social support to assist in their responsibilities while taking their child for treatment.

4. Discussion

This study has identified a number of issues that influence caregiver access to iCCM services delivered by HEWs at health posts in rural Ethiopia. The findings demonstrate that despite significant supply-side improvements in delivery and coverage of iCCM services in Ethiopia, caregivers continue to face an array of challenges in accessing services for children under the age of five. Most previous literature on access focuses on supply-side factors and "traditional" demand-side concerns such as awareness, financial and geographic barriers.¹⁸ In the context of scale up of the HEP and iCCM initiatives in Ethiopia which are expected to minimize these traditional barriers, this study found a range of other, less explored barriers that continue to impede utilization of iCCM services. Unless these barriers are addressed as a part of Ethiopia's iCCM scale up, it is

unlikely that utilization levels will improve significantly, and the goals of equity of access and program sustainability will not be translated into improved health and survival for children in rural Ethiopia.

Most health post users interviewed in this study were motivated to use the health post and expressed a high degree of satisfaction with iCCM services. However, these caregivers faced many difficulties in accessing iCCM services. In particular, the absence of the HEW was frequently mentioned. Although it was outside the scope of this study to explore supply-side factors such as the extent and causes of HEW absenteeism, caregiver perceptions and experiences clearly indicated that this is a major barrier to prompt utilization of the health post. This was particularly problematic for those communities with only one HEW staffing the health post. Three of the eight research sites only had one functional HEW present, in contrast to findings from surveys suggesting over 90% of health posts staffed by two HEWs.^{34,45} Other major challenges identified included inconvenient health post hours, especially during sudden changes in a child's condition, the cost of transportation, geographic factors such as distance and difficult terrain and the lack of time given domestic and subsistence responsibilities. These challenges are commonly found in other sub-Saharan Africa settings.^{18,46-47}

Despite these challenges, health post users generally were able to call upon their social support networks for help mitigating their effects. In their care-seeking narratives, users tended to list a wide range of social support, with prominent roles for female peers with children. The majority of users also suggested a relatively high degree of decision making power or the ability to engage social support in overcoming resistance from gatekeepers. These findings are supported by findings on social capital^{46,48} and female

autonomy⁴⁹⁻⁵⁰ in relation to improved access and utilization in other settings in sub-Saharan Africa. In fact, several of these authors have suggested that these factors are more influential in determining access than traditional variables such as cost.^{18,51} These factors were particularly important in explaining how caregivers living distant from the health post were able to overcome geographic barriers in accessing the health post. Many non-users similarly expressed a high degree of demand for health post services but were unable to overcome barriers due to a lack of social support or decision making power.

There were two major, interrelated dimensions of geographic barriers found in this study. The first is related to the time taken to travel and difficulties in transporting a sick child to the health post which is frequently reported in access literature.^{18,51-52} Difficulties were often compounded with a lack of transportation, especially during the wet season. The second dimension related to: (1) placement of the health post; (2) engagement of sub-villages by the HEW; and (3) notions of ownership of the health post. A large proportion of non-users felt marginalized by the HEW based on the location of their household often combined with sociocultural characteristics of their sub-village. Feelings of exclusion of the health post were reinforced through several specific types of barriers such as fewer contacts with HEWs and VCHWs during community outreach and mobilization activities, and negative interactions with HEWs leading to a lack of awareness of free and quality drugs and mistrust of HEWs. This geographic-based exclusion appears to overlap with exclusion of more vulnerable groups, given that marginalized sub-villages tended to be those recognized by participants as lower socioeconomic status areas. Given the central role of equity in iCCM scale up, it is not clear that the iCCM intervention is reaching the most vulnerable, and it might potentially

be reproducing inequities in access to health care seen in many sub-Saharan Africa settings.⁵³⁻⁵⁵

Several authors have argued for the key role of acceptability in determining demand and access, highlighting the central position of interactions between the health service consumer and provider.^{10,23,25} According to these authors, care seekers develop competencies such as seeking alternative sources of care to avoid interactions that negatively affect their self-worth, sense of trust and community. At a community level, a lack of or negative engagement dis-empowers communities, entrenches mistrust and restricts healthcare options.¹⁰ These processes were found in some degree at all research sites in this study. However, the level of mistrust was particularly high at the low utilization sites selected. In two sites, nearly all the caregivers described the HEW as having negative attitudes, directed especially at certain sub-villages. At the other two sites, there was considerable conflict between the HEW and religious and community leaders, leading to community division and a low-trust environment.

This study offers insights into why caregivers use/do not use HEWs providing child health services from the perspectives of caregivers themselves. The qualitative methods provide more comprehensive context for findings on low utilization of HEWs from quantitative surveys. In light of these findings, innovative approaches are needed that address challenges outlined by these perspectives in order to reduce barriers and promote demand for iCCM services. Continued and targeted strengthening of supply-side improvements are necessary to reduce delays and ensure access for caregivers of sick children. In particular, efforts to monitor and ensure the *de facto* availability of two HEWs at each health post, and provision of training in culturally-sensitive

communication are critical. In order to complement gains seen in the delivery and quality of iCCM services, it is vital to focus on community mobilization strategies with active community participation.⁵⁶ Despite HEP stipulations that an HEW allocate 75% of her time to these activities, it is clear that HEWs are burdened and often unmotivated to meet this requirement, especially with additional responsibilities associated with providing iCCM services.

The recent HDA initiative offers a unique opportunity to address many of the barriers found in this study. The expectation is that demand-generation activities operationalized through behavior change and communication and community mobilization strategies of the HEP and iCCM initiatives will be shifted to these volunteers. There are important risks inherent in this initiative, as can be seen by the limited impact of the smaller-scale VCHW project seen in this study and others.³³ As can be seen from this study, it is essential to ensure a more homogenous recruitment and deployment throughout a *kebele* and potentially targeting areas of low demand and high child illness burden needed.

However, the scale and reach of this grassroots initiative is impressive, and suggests the potential to achieve a significantly wider and deeper reach into communities. Members of the HDA can foster a dialogue between HEWs and community members in order to integrate users' perceptions and needs into priority setting processes, improve social and community connections to and ownership of the health post and catalyze community actions and partnerships. Finally, there is a role for the HDA in promoting active case finding and rapid referral networks linking community members to the health post.

References

1. Young M, Wolfheim C, Marsh DR, Hammamy D. World Health Organization/United Nations Children's Fund joint statement on integrated community case management: an equity-focused strategy to improve access to essential treatment services for children. *American Journal of Tropical Medicine & Hygiene*. 2012; **87**(Suppl. 5): 6-10.
2. Gericke CA, Kurowski C, Ranson MK, Mills A. Intervention complexity—a conceptual framework to inform priority-setting in health. *Bulletin of the World Health Organization*. 2005; **83**(4): 285-93.
3. Marsh DR, Gilroy KE, Wolfheim C, Wansi E, Qazi S. Community case management of pneumonia: at a tipping point? *Bulletin of the World Health Organization*. 2008; **86**(5): 381-9.
4. Ram PK, Choi M, Blum LS, Wamae AW, Mintz ED, Bartlett AV. Declines in case management of diarrhea among children less than five years of age. *Bulletin of the World Health Organization*. 2008; **86**(3): E-F.
5. UNICEF. *Review of Systematic Challenges to the Scale-up of Integrated Community Case Management: Emerging Lessons and Recommendations from the Catalytic Initiative (CI / IHSS)*. New York: UNICEF; 2012.
6. George A, Menotti EP, Rivera D, Marsh DR. Community case management in Nicaragua: lessons in fostering adoption and expanding implementation. *Health Policy and Planning*. 2010; **26**(4): 327-37.
7. Hanson K, Ranson MK, Oliveira-Cruz V, Mills A. Expanding access to priority health interventions: a framework for understanding the constraints to scaling-up. *Journal of International Development*. 2003; **15**(1): 1-14.

8. Ensor T, Cooper S. Overcoming barriers to health service access: influencing the demand side. *Health Policy and Planning*. 2004; **19**(2): 69-79.
9. Pokhrel S. Scaling up health interventions in resource-poor countries: what role does research in stated-preference framework play? *Health Research Policy and Systems*. 2006; **4**: 4.
10. Thiede M. Information and access to health care: is there a role for trust? *Social Science and Medicine*. 2005; **61**(7): 1452-62.
11. Mukanga D, Tibenderana JK, Peterson S, Pariyo GW, Kiguli J, Waiswa P, et al. Access, acceptability and utilization of community health workers using diagnostics for case management of fever in Ugandan children: a cross-sectional study. *Malaria Journal*. 2012; **11**: 121.
12. Kalyango JN, Lindstrand A, Rutebemberwa E, Ssali S, Kadobera D, Karamagi C, et al. Increased use of community medicine distributors and rational use of drugs in children less than fever years of age in Uganda caused by integrated community case management of fever. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 36-45.
13. Jacobs B, Ir P, Bigdeli M, Annear PL, van Damme W. Addressing access barriers to health services: an analytical framework for selecting appropriate interventions in low-income Asian countries. *Health Policy and Planning*. 2012; **27**(4): 288-300.
14. Winch PJ, Leban K, Casazza L, Walker L, Percy K. An implementation framework for household and community integrated management of childhood illness. *Health Policy and Planning*. 2002; **17**(4): 345-53.

15. Marsh DR, Hamer DH, Pagnoni F, Peterson S. Introduction to a special supplement: evidence for the implementation, effects, and impact of the integrated community case management strategy to treat childhood infection. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 2-5.
16. WHO/UNICEF. *WHO/UNICEF Joint Statement: Integrated Community Case Management (iCCM): An Equity-Focused Strategy to Improve Access to Essential Treatment Services for Children*. Geneva and New York: WHO and UNICEF; 2012.
17. Pokhrel S, Sauerborn R. Household decision-making on child health care in developing countries: the case of Nepal. *Health Policy and Planning*. 2004; **19**(4): 218-33.
18. Rutherford ME, Mulholland K, Hill PC. How access to health care relates to under-five mortality in sub-Saharan Africa: systematic review. *Tropical Medicine and International Health*. 2010; **15**(5): 508-19.
19. United Nations General Assembly (UNGA). *United Nations Millennium Declaration. United Nations General Assembly Resolution 55/2*. New York: UNGA; 2000.
20. Oliver A, Mossialos E. Equity of access to health care: outlining the foundations for action. *Journal of Epidemiology and Community Health*. 2004; **58**(8): 655-8.
21. Penchansky R, Thomas J. The concept of access: definition and relationship to consumer satisfaction. *Medical Care*. 1981; **19**(2): 127-40.
22. O'Donnell O. Access to health care in developing countries: breaking down demand side barriers. *Cadernos de Saúde Pública*. 2007; **23**(12): 2820-34.
23. Ricketts TC, Goldsmith LJ. Access in health services research: the battle of the frameworks. *Nursing Outlook*. 2005; **53**(6): 274-80.

24. Peters DH, Garg A, Bloom G, Walker DG, Brieger WR, Rahman MH. Poverty and access to health care in developing countries. *Annals of the New York Academy of Sciences*. 2008; **1136**: 161-71.
25. McIntyre D, Thiede M, Birch S. Access as a policy-relevant concept in low- and middle-income countries. *Health Economics, Policy and Law*. 2009; **4**(2): 179-93.
26. UNICEF. *Committing to Child Survival: A Promise Renewed Progress Report 2013*. New York: UNICEF; 2013.
27. Mariam DH. Bridging the availability-utilization gap: the issue of quality in the provision of health care. *Ethiopian Journal of Health Development*. 2011; **25**(1): 1-2.
28. Onarheim KH, Tessema S, Johansson KA, Eide KT, Norheim OF, Miljeteig I. Prioritizing child health interventions in Ethiopia: modeling impact on child mortality, life expectancy and inequality in age at death. *PLoS One*. 2012; **7**(8): e41521.
29. Black RE, Cousens S, Johnson HL, Lawn JE, Rudan I, Bassani DG, et al. Global, regional and national causes of child mortality in 2008: a systematic analysis. *Lancet*. 2010; **375**(9730): 1969-87.
30. Central Statistical Agency [Ethiopia], ORC Macro. *Ethiopia Demographic and Health Survey 2011*. Addis Ababa, Calverton: Central Statistical Agency [Ethiopia], ORC Macro; 2012.
31. Mebratie AD, Van de Poel E, Yilma Z, Abebaw D, Alemu G, Bedi AS. Healthcare-seeking behavior in rural Ethiopia: evidence from clinical vignettes. *BMJ Open*. 2014; **4**(2): e004020.

32. Mela Research, PLC. *Baseline Coverage Survey for the Independent Prospective Evaluation of the Integrated Community Case Management (ICCM) in Oromia Region, Ethiopia: Draft Report*. Addis Ababa: Mela Research, PLC; 2011.
33. The Last Ten Kilometers Project (L10K). *Changes in Maternal, Newborn and Child Health in 115 Rural Woredas of Amhara, Oromia, SNNP and Tigray Regions of Ethiopia, 2008-2010: Findings from the L10K Baseline and Midterm Surveys*. Addis Ababa: John Snow International (JSI); 2012.
34. Teklehaimanot HD, Teklehaimanot A. Human resource development for a community-based health extension program: a case study from Ethiopia. *Human Resources for Health*. 2013; **11**(1): 39.
35. Government of Ethiopia, Federal Ministry of Health. *Health Sector Development Program, 2010/11-2014/15*. Addis Ababa: Government of Ethiopia, Federal Ministry of Health; 2011.
36. Assefa T, Belachew T, Tegegn A. Mothers' health care seeking behavior for childhood illnesses in Derra District, Northshoa Zone, Oromia Regional State, Ethiopia. *Ethiopian Journal of Health Sciences*. 2008; **18**(3): 87-94.
37. Fantahun M, Degu G. Health service utilization in Amhara region of Ethiopia. *Ethiopian Journal of Health Development*. 2003; **17**(2): 141-7.
38. Getahun A, Deribe K, Deribew A. Determinants of delay in malaria treatment-seeking behaviour for under-five children in south-west Ethiopia: A case control study. *Malaria Journal*. 2010; **9**: 320.
39. Deressa W. Treatment-seeking behavior for febrile illness in an area of seasonal malaria transmission rural Ethiopia. *Malaria Journal*. 2007; **6**(1): 49.

40. Deressa W, Ali A, Berhane Y. Household and socioeconomic factors associated with childhood febrile illnesses and treatment seeking behavior in an area of epidemic malaria in rural Ethiopia. *Transactions of the Royal Society of Tropical Medicine and Hygiene*. 2007; **101**(9), 939-47.
41. Creswell JW. *Qualitative Inquiry and Research Design: Choosing among Five Approaches*. Thousand Oaks: Sage Publications; 2007.
42. Scrimshaw S, Hurtado E. *Rapid Assessment Procedures for Nutrition and Primary Health Care: Anthropological Approaches to Improving Program Effectiveness*. Tokyo: United Nations University; 1987.
43. Pelto PJ, Pelto GH. Studying knowledge, culture and behavior in applied medical anthropology. *Medical Anthropology Quarterly*. 1997; **11**(2): 147-63.
44. Middlestadt SE, Bhattacharyya K, Rosenbaum J, Fishbein M, Shepherd M. The use of theory based semistructured elicitation questionnaires: formative research for CDC's Prevention Marketing Initiative. *Public Health Reports*. 1996; **111**(Suppl. 1): 18-27.
45. Miller N. *Integrated Community Case Management of Childhood Illness in Ethiopia: Implementation Strength and Quality of Care*. Dissertation Report. Baltimore: Johns Hopkins University; 2013.
46. Bakeera SK, Petzold M, Pariyo GW. Community social capital and the use of health care services in Uganda. *Journal of Public Health and Epidemiology*. 2010; **2**: 189-98.
47. Chuma J, Gilson L, Molyneux C. Treatment-seeking behavior, cost burdens and coping strategies among rural and urban households in Coastal Kenya: an equity analysis. *Tropical Medicine and International Health*. 2007; **12**(5): 673-86.

48. Cassell JA, Leach M, Fairhead JR, Small M, Mercer CH. The social shaping of childhood vaccination practice in rural and urban Gambia. *Health Policy and Planning*. 2006; **21**(5): 373-91.
49. Fantahun M, Berhane Y, Wall S, Byass P, Högberg U. Women's involvement in household decision-making and strengthening social capital-crucial factors for child survival in Ethiopia. *Acta Paediatrica*. 2007; **96**(4): 582-9.
50. Rutherford ME, Dockerty JD, Jasseh M, Howie SR, Herbison P, Jeffries DJ, et al. Access to health care and mortality of children under 5 years of age in the Gambia: a case-control study. *Bulletin of the World Health Organization*. 2009; **87**(3): 216-24.
51. Thaddeus S, Maine D. Too far to walk: maternal mortality in context. *Social Science and Medicine*. 1994; **38**(8): 1091–110.
52. Noor A, Amin A, Gething P, Atkinson PM, Hay SI, Snow RW. Modelling distances travelled to government health services in Kenya. *Tropical Medicine and International Health*. 2006; **11**(2): 188-96.
53. Victora CG, Vaughan JP, Barros FC, Silva AC, Tomasi E. Explaining trends in inequities: evidence from Brazilian child health studies. *Lancet*. 2000; **356**(9235): 1093-8.
54. Schellenberg JA, Victora CG, Mushi A, de Savigny D, Schellenberg D, Mshinda H, et al. Inequities among the very poor: health care for children in rural southern Tanzania. *Lancet*. 2003; **361**(9357): 561-6.
55. Barat LM, Palmer N, Basu S, Worrall E, Hanson K, Mills A. Do malaria control interventions reach the poor? A view through the equity lens. *American Journal of Tropical Medicine and Hygiene*. 2004; **71**(Suppl. 2): 174-8.

56. Rosato M, Laverach G, Grabman LH, Tripathy P, Nair N, Mwansambo C, et al.
Community participation: lessons for maternal, newborn and child health. *Lancet*. 2008;
372(9642): 962-71.

Table 1: Child illness and care seeking in Ethiopia

	Percentage with symptoms in preceding two weeks	Percentage for whom advice was sought from a health facility or provider	Percentage who received treatment (type)
<i>ARI^a</i>	7.0	27.0	6.8 (antibiotics)
<i>Diarrhea</i>	13.4	31.8	30.7 (ORT) ^b
			13.2 (antibiotics)
<i>Fever</i>	17.1	24.2	3.6 (anti-malarials)
			6.8 (antibiotics)

Source: Central Statistical Agency [Ethiopia], ORC Macro. *Ethiopia Demographic and Health Survey 2011*. Addis Ababa, Calverton: Central Statistical Agency [Ethiopia], ORC Macro; 2012.

^a Acute respiratory infection

^b Includes either oral rehydration solution or recommended home fluids

Table 2: Characteristics of selected *kebele* sites

	Woreda	Utilization^a	Distance to referral facility (in km)	Catchment size (in square km)	Number of functional HEWs
<i>Jimma</i>					
Site 1	Goma	Low	23	16	1
Site 2	Omo Nada	Medium	8	9	2
Site 3	Shebe Seneba	Medium	31	20	2
Site 4	Kersa	High	10	8	3
<i>West Hararghe</i>					
Site 5	Oda Bultum	Low	5	10	1
Site 6	Gemechis	Medium	3	17	2
Site 7	Boke	Medium	25	42	1
Site 8	Boke	High	13	21	1

Source: Miller N. *Integrated Community Case Management of Childhood Illness in Ethiopia: Implementation Strength and Quality of Care*. Dissertation Report. Baltimore: Johns Hopkins University; 2013.

^aLow: 0-10 sick child consultations/month; medium: 10-40; high: >40

Table 3: Sample size by method

<i>Technique, Population</i>	Per site	Total (for all sites)
FGD, Mothers	2 (6-12 individuals)	16 (132 individuals)
IDI, Mothers	4-6	40
IDI, Fathers	2	16
IDI, HEWs	1-2	10
IDI, Volunteer/HDA ^a	1-2	12
<i>Total</i>	<i>10-14</i>	<i>94</i>

^a Volunteer community health worker and/or member of the Health Development Army

Paper 3: Determinants of utilization of Health Extension Workers in the context of scale up of integrated community case management of common childhood illness in Oromia Region, Ethiopia

1. Introduction

Ethiopia has made considerable progress in reducing child mortality, recently meeting the fourth Millennium Development Goal (MDG 4) target of a two-thirds reduction in deaths of children younger than five years between 1990 and 2015.¹ The under-5 mortality rate (U5MR) has decreased from 204 child deaths per 1,000 live births in 1990 to 68 per 1,000 live births in 2012.¹⁻² Nevertheless, approximately 194,000 children in Ethiopia die before reaching five years of age.³ The primary causes of under-five deaths in sub-Saharan African (SSA) countries are diarrhea, malaria and pneumonia accounting for approximately one-third of all under-five deaths.³⁻⁴

Empirical evidence shows that the use of evidence-based child health interventions targeting these common childhood illnesses could prevent a large portion of these child deaths.⁵⁻⁶ Much of the decline in child mortality in Ethiopia has been attributed to increasing coverage of child health interventions, particularly efforts extending low-cost services to the largely rural populace.⁷⁻⁸ Despite increases in coverage, utilization of appropriate healthcare sources has only marginally improved and remains low in comparison to other SSA nations.⁸ Studies on care-seeking for malaria in rural Ethiopia have found substantial social and economic disparities in utilization of formal sources of care suggesting that poor and rural populations continue to face considerable barriers in accessing evidence-based child health interventions.⁹⁻¹⁰

A number of large-scale initiatives have been taking place in Ethiopia to increase coverage of child health interventions and reduce barriers to access. In 2004, the health extension program (HEP) was launched, creating a new cadre of community health worker (CHW), the health extension worker (HEW), conducting community education and mobilization activities from a community health post.¹¹ Since the initiative's inception, the role of HEWs has been expanded to include community case management (CCM) of child diarrhea and malaria enabling HEWs to treat uncomplicated cases based on simple algorithms as part of the HEP program.¹¹⁻¹² Following a policy change supporting community-based treatment of pneumonia in 2010, Ethiopia has been scaling up integrated community case management of common childhood illnesses (iCCM) in six regions within the country. In these areas, HEWs have now been trained to assess, identify, classify and treat uncomplicated cases and refer severe cases of diarrhea, malaria, pneumonia and severe acute malnutrition (SAM) to a health center.¹³ Table 1 gives the programmatic inputs for both routine CCM and iCCM programs.

Despite the pivotal role of HEWs at the community health post as the first point of contact for sick children in both the HEP and iCCM initiatives, utilization has been found to be very low. Estimates of utilization of the HEW at the health post for sick children range from 4% to 17% with large variation between regions and by illness.¹⁴⁻¹⁵ At such low levels of utilization it is unlikely that Ethiopia's efforts are achieving their full potential in reducing under-five deaths. Since the implementation of the HEP and iCCM initiatives, few published studies have explored the reasons for low levels of utilization and the effectiveness of these programs in promoting access to appropriate child health services.^{9-10,16} Furthermore, very few studies have looked at the effects of

these programs by specific sub-populations, and it is uncertain whether they are reaching the most vulnerable sub-populations and promoting equity as intended.¹⁷

Utilization of health services is a complex behavioral phenomenon, especially in settings with multiple healthcare options. Empirical studies have often found that use of health services is related to the availability, quality and cost of services, as well as the social structure, health beliefs and personal characteristics of the users.¹⁸⁻²¹ A considerable and diverse body of literature has arisen exploring potential determinants of health services utilization, particularly those relating to cost and distance of services.²¹ One of the most widely utilized frameworks for exploring these determinants is the Andersen behavioral model of health service use (Figure 1).^{18,20} According to this model, factors that can influence health care utilization can be broadly categorized as: (1) predisposing characteristics, including demographic factors and health beliefs; (2) enabling characteristics, including household resources and community factors; and (3) need characteristics, including both perceived and actual needs.²⁰ This framework shifts from an individual-level focus to a combination of the individual, the healthcare system, the external environment and the effects that each have on the others.

In the context of increasing availability of free services provided by HEWs within rural Ethiopian communities, it is essential to explore additional determinants and patterns in health services utilization.¹⁸⁻¹⁹ An understanding of these determinants is a prerequisite to strengthening health systems and attaining universal and equitable child health services through the identification of remaining access barriers and vulnerable populations. This study seeks to fill the gap in knowledge of determinants of care seeking from the HEWs at the health post in the context of scale up of iCCM services. It takes

place in two rural zones in Oromia region, Ethiopia. In these zones, iCCM has been phased in with training of HEWs beginning in early 2011, and *woredas* (districts) are receiving either routine CCM (within the HEP) or iCCM services. At this stage, it is important to take stock and evaluate how the addition of iCCM has influenced care-seeking behaviors of caregivers of sick children and the underlying determinants of access and use of evidence-based child health services. The study will explore differences between the CCM and iCCM models of child health service delivery in terms of: (1) types of care seeking sources used and predictors of type of source used; (2) the effect of CCM and iCCM on use of the HEW at the health post for sick children; (3) determinants of use of the HEW at the health post in *woredas* providing routine CCM versus iCCM services; and (4) caregiver reasons for not using the HEW at the health post for a sick child.

2. Methods

2.1 Sample size and sampling procedures

The study took place in rural *woredas* in Jimma and West Hararghe zones in Oromia region. These zones were chosen because of their relatively large populations, strong presence of iCCM implementation partners and phased implementation of the iCCM program. As part of the phase-in process, rural *woredas* were randomly assigned to receive either iCCM or the routine CCM within each zone. *Woredas* providing the iCCM program were fully implementing iCCM as of July 2011.

The study was part of a cross-sectional survey carried out to determine differences in child mortality and coverage for key child health indicators in the context of iCCM

scale up in the Oromo region, Ethiopia. The sample size for the coverage survey was determined using the indicator of treatment of acute respiratory infection (ARI) among children under-five. Based on this indicator, 6,000 households were needed each for routine CCM and iCCM areas to measure a level of treatment of ARI among children under-five of 50% with an absolute precision of 6%. This gave a total sample of 12,000 households.

The survey used a stratified two-stage cluster sampling design with clusters represented by the 2007 census enumeration areas (EAs) and strata represented by rural *woredas*. Information for EAs was obtained from the Central Statistical Agency of Ethiopia. In the first stage of sampling, EAs within each *woreda* were selected using systematic random sampling with probability proportionate to size. Households in each selected EA were listed, and a subset of 35-36 households was randomly selected for inclusion using systematic random sampling. Heads of households were interviewed to obtain a list of all members of the household, and eligible women age 15-49 and primary caregivers of under-five children were identified for interviews.

2.2 Study sample

The sample for this study consists of all under-five children residing in or having slept in a selected household on the previous night and identified as having been sick with diarrhea, fever or pneumonia in the two weeks prior to the interview. The child's primary caregiver completed the interview (the biological mother for 97.2% of the children). A single caregiver could be interviewed for multiple children that met this condition. Children with diarrhea or fever were identified based on the reported presence of those symptoms. Presence of pneumonia was presumed and based on responses to a

series of questions identifying the presence of cough and faster than usual breathing with difficulty breathing due to chest problems.

2.3 Survey instruments and data collection

The survey was comprised of three modules: a household, women's and under-five questionnaire. The household questionnaire consisted of sub-modules for a listing of all household members and demographic information. The head of household was interviewed to provide this information. The women's questionnaire included the woman's demographic information and birth history. Women age 15-49 were interviewed for this module. The under-five survey included sub-modules on child demographic information and for the prevalence and practices associated with cough/fever and diarrhea.

The modules and interview questionnaires were based primarily on the Demographic and Health Survey (DHS) and the Multiple Indicator Cluster Survey (MICS). These modules were modified to include specific domains of interest. The main modification was the addition of a care-seeking module in the under-five questionnaire. Questionnaires were developed in English and translated into Afan Oromo and Amharic. Questionnaires were pretested among ten Afan Oromo-speaking households in a rural *kebele* approximately 20 kilometers from Addis Ababa. Several translation iterations were conducted based on feedback from the pretest and over the course of training to refine the instruments in terms of clarity of concepts and translation. The final questionnaires were piloted over two days in 20 EAs in a rural *woreda* of Oromia approximately 40 kilometers from Addis Ababa by all data collectors.

One hundred twenty data collectors who had completed high school, had experience in doing survey interviews and were fluent in English and Afan Oromo were trained for 23 days. Twenty of the highest performing data collectors were selected as supervisors to head 20 teams of one supervisor and four data collectors each. Nine teams deployed to West Haraghe and 11 to Jimma with a list of selected EAs to be completed. Permission to conduct interviews was obtained by zonal and *woreda* health bureaus prior to data collection for each site. Logistics of the survey were contracted to a local research firm, Alliance for Better Health services, PLC (ABH) based in Addis Ababa. Each team spent approximately one day mapping an EA and one to two days conducting interviews after mapping. Data were collected on laptop computers using a computer assisted personal interviewing feature of Census and Survey Processing System (CSPRO) software (US Census Bureau, Washington, DC). Three staff members from the Institute for International Programs at Johns Hopkins University (IIP-JHU) including the first author, and two staff members from ABH were present to provide additional support and monitoring. Random quality control checks were conducted by team supervisors, ABH and IIP-JHU staff. Data was incorporated directly into a central electronic database in Addis Ababa. Validity and consistency checks were run in CSPro to check entered data. Data collection occurred for four months from February 2013 through July 2013.

Ethical approval was obtained from the Johns Hopkins Bloomberg School of Public Health and the Oromia Regional Health Bureau in Addis Ababa. Oral informed consent was obtained from all study participants.

2.4 Measures

The primary outcome of interest for this study was reported utilization of the HEW and/or health post by a caregiver of an under-five child sick with diarrhea, fever and/or suspected pneumonia in the two weeks preceding an interview (N = 2,248). A key independent variable of interest was residence of the caregiver/child in *woreda* providing: (1) routine CCM services and (2) iCCM services. Covariates considered in this analysis were grouped into predisposing characteristics: religion, household size, marriage status, maternal age, maternal education, maternal literacy, previous use of health post services and child gender; enabling characteristics: zone of residence, household wealth and awareness of the availability of treatments for child illness at the health post; and need characteristics: maternal knowledge of child illness danger signs, previous experience of a child death, child age and illness type. Categorizations were based on hypothesized relationships between independent variables and the use of the HEW at the health post for a sick child in the Andersen framework.^{18,20} Household wealth was grouped into wealth quintiles based on index scores constructed for each household using principal component analysis of household assets, income sources and housing characteristics).²² Considering the similarities between such quintiles as suggested by Agho et al.,²³ the wealth quintiles were re-categorized into three groups: (i) lowest 40%, (ii) middle 40%; and (iii) upper 20%. Distance from the nearest health facility or health post was based on reported travel time, which has been suggested as a superior measure to direct distance.²⁴⁻²⁵ Awareness of child health services at the health post was determined by asking caregivers the open-ended question “what services do HEWs deliver at the health post?” Responses were categorized into pre-coded options including “treating sick children.”

Knowledge of child danger signs was assessed from an open-ended question “what are the illness danger signs for sick children?” Responses were categorized according to pre-coded options for nine integrated management of childhood illness (IMCI) danger signs.²⁶

2.5 Model selection and data analysis

Data analysis was conducted using STATA version 13 (StataCorp, College Station, TX). Exploratory data analyses were conducted to examine the extent of missing data and dispersion of the outcome and explanatory variables. Factors associated with utilization of the HEW at the health post were examined using bivariate and multivariate logistic regression. All descriptive statistics and logistic regressions were computed using the *svy* command in STATA. This command accounted for the complex design and nested structure of the data, weighting observations by the inverse probability of selection and using the Taylor linearization procedure for computing standard errors.²⁷ Strong collinearity was found between caregiver literacy status and education and literacy status was dropped from the analysis. Caregiver marriage status was also dropped due to very low numbers of unmarried caregivers.

For multiple logistic regression, independent variables were introduced in blocks with predisposing characteristics entered first (model 1) followed by predisposing + enabling characteristics (model 2) followed by predisposing + enabling + need characteristics (model 3). Previous use, awareness of the availability of treatments for child illness and maternal knowledge of danger signs were not included in multiple logistic regression models as they were likely to be influenced by the type of child health intervention (routine CCM vs. iCCM). To evaluate the effect of the iCCM intervention

on utilization of the HEW at the health post, adjusted odds ratios (aORs) were evaluated for this independent variable of interest in each of the models accounting for potential confounders. To evaluate significant factors associated with utilizing the HEW at the health post unique to routine CCM versus iCCM *woredas*, logistic regression models using the block procedure were also run after stratifying the sample according to type of child health services available. The relationship between predictor variables and the outcomes of interest were considered marginally significant at the $p < 0.10$ level and significant at the $p < 0.05$ level.

Multinomial logistic regression analyses were conducted to examine factors associated with utilization of a type of source among multiple options. The outcome of interest for these analyses was choice of health care source grouped into: (1) no care/home care; (2) HEW at the health post; (3) health center; and (4) private care source. Three multinomial regression models were run using the following reference groups: (1) no care/home care; (2) HEW at the health post; and (3) private care source. This strategy generated six models of all possible comparisons between sources. In particular, multinomial logistic regression was performed to assess differences in patterns of use of these sources comparing iCCM *woredas* to routine CCM *woredas*. Independent variables that were hypothesized to impact choice among these alternatives and those that were largely exogenous to the decision were included in multinomial logistic regression models. These variables included type of child services available (routine CCM vs. iCCM), maternal education status, child gender, zone of residence, household wealth, household distance from the health post and previous experience of a child death. Multinomial logistic regression results were given in adjusted relative risk ratios (aRRR).

3. Results

3.1 Characteristics of study participants

Selected predisposing, enabling and need characteristics collected for the sample are presented in Table 2. Participants indicated a total of 2,248 caregivers of children sick with diarrhea, fever and/or suspected pneumonia in the two weeks prior to the interview. Looking at predisposing characteristics, the majority of selected households were predominantly Muslim (92.2%) with the remaining 7.8% Christian (mostly Ethiopian Orthodox with smaller numbers of Catholics and Protestants). The mean (standard deviation: SD) household size was 6.1 (2.1) individuals. The mean (SD) age of caregivers was 29.1 (6.7) years and most mothers did not have any formal education (78.6%). Slightly more than one-fifth (21.4%) of caregivers previously used health post services for child illness.

For enabling characteristics, more caregivers were selected from Jimma zone (63.7%) compared to West Hararghe (36.3%) given the larger population of Jimma. The range for walking time to the health post reported by caregivers was between one minute and ten hours with 37.7% reporting a walking distance less than 30 minutes, 26.6% from 30-60 minutes, 24.4% from one to two hours and 11.4% greater than two hours. Households with sick children selected for this sub-analysis tended to be slightly poorer compared to all households involved in the evaluation survey. Over one-half (56.9%) of caregivers did not mention the availability of child health services at the health post when listing available health services.

For need characteristics, nearly one-tenth (9.4%) of caregivers could not mention a single IMCI child danger sign. Caregivers mentioned a mean (SD) of 2.5 (1.4) child

illness danger signs. One-third (33.6%) of caregivers reported previously experiencing a child death. Of the sick children, 44.5% of caregivers reported the presence of diarrhea, 69.2% fever and 24.4% pneumonia. Nearly one-third (32.3%) reported more than one of these illnesses for their child.

A total of 1,247 children were reported sick with diarrhea, fever and/or suspected pneumonia in the previous two weeks in *woredas* providing routine CCM services compared to 1,001 in *woredas* providing iCCM services. There were a few statistically significant differences at the $p < 0.05$ level in characteristics between these settings. There were some differences in proportions of categories of household wealth. However, the difference was primarily between proportions in the middle 40% and wealthiest 20%. Proportions in the poorest 40% were similar for both areas. Statistically significant differences were also detected for knowledge of danger signs and awareness of the availability of child health services at the health post with higher proportions of caregivers in iCCM *woredas* reporting awareness of the availability of child health services at the health post and mentioning a larger number of child illness danger signs compared to caregivers in routine CCM *woredas*.

3.2 Care-seeking sources

Reported care-seeking sources by caregivers of a child sick with diarrhea, fever and/or pneumonia in the two weeks preceding the survey are given in Figure 2. Of the 2,248 caregivers in this analysis, 643 (31.0%) reported seeking care from an appropriate source—a source where evidence-based child health treatments could, in theory, be obtained. Among appropriate sources, 188 (9.3%) sought care from HEWs at the health post, 335 (16.0%) from a higher-level public source and 154 (7.3%) from a private

source. For those not reporting use of an appropriate source, 685 (67.2%) reported no care or home-based care only and 48 (2.2%) reported use of an informal source of care—including traditional healers and local drug vendors. A small percentage (1.5%) of caregivers reported using multiple sources of care for sick children.

Differences in appropriate care seeking between caregivers residing in *woredas* providing iCCM services (29.5%) and caregivers residing in *woredas* providing routine CCM services (32.6%) were not statistically significant. Differences in utilization of the HEW at the health post were marginally significant ($p=0.07$) between caregivers residing in *woredas* providing iCCM services (10.8%) and caregivers residing in *woredas* providing routine CCM services (7.7%). Higher proportions of caregivers in *woredas* providing routine CCM services used both private sources and informal sources (9.3% and 3.3%, respectively) compared to caregivers in *woredas* providing iCCM services (5.5% and 1.2%, respectively) and both were statistically significant at the $p < 0.05$ level.

3.3 Utilization of HEWs at the health post

Of the 2,248 caregivers in this analysis, 188 (9.3%) sought care from the HEW/health post over the course of their child's illness. By intervention type, 95 (7.7%) caregivers utilized the HEW/ at the health post in routine CCM *woredas* and 93 (10.8%) in iCCM *woredas*. Table 3 presents the results of logistic regression models for care seeking from the HEW at the health post comparing caregivers in routine CCM *woredas* to those in iCCM *woredas*. In the univariate logistic regression model, caregivers in iCCM *woredas* were more likely (OR 1.44; 95% CI: 0.97-2.12; $p = 0.07$) to use the HEW at the health post compared to caregivers in routine CCM *woredas*. No significant relationships were observed after accounting for predisposing (aOR 1.35; 95% CI: 0.91-

2.00; $p = 0.13$), enabling (aOR 1.35; 95% CI: 0.91-1.99; $p = 0.14$) and need characteristics (aOR 1.33; 95% CI: 0.89-1.97; $p = 0.16$) in models 1, 2 and 3, respectively.

3.4 Determinants of utilization of HEWs at the health post

In bivariate analyses (Table 4), previous use of the health post for child illness (OR 6.01; 95% CI: 3.84-9.40; $p < 0.01$) and awareness of the availability of treatments for child illness at the health post (OR 2.52; 95% CI: 1.64-3.84; $p < 0.01$) were the strongest predictors of health post use for caregivers in both routine CCM and iCCM *woredas*. Increasing distance of a household from the health post was significantly associated with a lower likelihood of using the health post with caregivers residing a 30-60 minute walk (OR 0.66; 95% CI: 0.42-1.04; $p < 0.10$), a 1-2 hour walk (OR 0.61; 95% CI: 0.39-0.95; $p < 0.05$) and greater than two hour walk (OR 0.55; 95% CI: 0.30-0.99; $p < 0.05$) all significantly less likely to use the health post compared to caregivers residing less than a 30 minute walk to the health post. Caregivers in West Hararghe were also less likely to use the health post (OR 0.70; 95% CI: 0.47-1.04; $p < 0.10$) compared to caregivers in Jimma zone.

Table 5 compares determinants of utilization of the HEW at the health post between routine CCM and iCCM *woredas* after accounting for confounders. In the final model accounting for predisposing, enabling and need factors in routine CCM *woredas*, significant relationships were found only for maternal age and household distance from the health post with use of the HEW at the health post for a sick child. In routine CCM areas, younger caregivers (ages 15-19) were less likely (aOR 0.06; 95% CI: 0.01-0.58; $p < 0.05$) to use the health post compared to caregivers of age 20-29. Children in

households living 31-60 minutes were less likely (aOR 0.51; 95% CI: 0.24-1.07; $p < 0.10$) to be taken to the health post compared to children living within 30 minutes travel time to the health post.

In iCCM *woredas* in the model (model 3) accounting for predisposing, enabling and need characteristics, maternal education, child age and illness type were all significantly related to use of the health post. In contrast to determinants in CCM *woredas*, no significant relationships were found by use of the health post and categories of maternal age. However, mothers with some formal education had lower odds (aOR 0.46; 95% CI: 0.26-0.79; $p < 0.01$) for using the health post compared to mothers with no formal education. For distance, in contrast to caregivers in CCM *woredas*, there was a steady decreasing odds for using the health post as distance increased with caregivers residing between 1-2 hours less likely (aOR 0.31; 95% CI: 0.15-0.69; $p < 0.01$) and caregivers residing more than 2 hours less likely (aOR 0.29; 95% CI: 0.11-0.73; $p < 0.01$) to use the health post compared to caregivers residing less than a 30 minute walk from the health post. Significant relationships were also found for child age and illness type for use of health post services. In contrast to CCM *woredas*, children in iCCM *woredas* who were under the age of one year were significantly less likely (aOR 0.31; 95% CI: 0.13-0.74; $p < 0.01$) to be taken to the health post. Finally, children with reported pneumonia were more likely (aOR 2.69; 95% CI: 1.30-5.56; $p < 0.05$) to be taken to the health post compared to children with reported diarrhea only. No significant relationships were seen by household wealth.

3.5 Choice between sources of appropriate care

Table 6 reports results from the multinomial regression models examining the association between type of child health services and selected sociodemographic and socioeconomic factors and type of source utilized for a sick child. Relative to caregivers in CCM *woredas*, those in iCCM ones were less likely to use the health center (aRRR 0.65; 95% CI: 0.39-1.09; $p < 0.10$) and private sources of care (aRRR 0.44; 95% CI: 0.25-0.76; $p < 0.01$) suggesting that the iCCM strategy was leading to use of health posts over higher levels of care.

Looking at sociodemographic factors in multinomial regression models, maternal education was significantly associated with increased likelihood of using the health center (aRRR 1.69; 95% CI: 1.20-2.38; $p < 0.01$) and private sources (aRRR 2.41; 95% CI: 1.56-3.73; $p < 0.01$) relative to home care only, while there was no difference between use of the health post compared to use of home care only by maternal education. Maternal education was also significantly associated with increased likelihood of using the health relative to the health post (aRRR 2.01; 95% CI: 1.13-3.59; $p < 0.05$) and private sources relative to the health post (aRRR 2.86; 95% CI: 1.60-5.12; $p < 0.01$) after controlling for selected factors and type of child health intervention. There were differences observed between zones with caregiver in West Hararghe less likely (aRRR 0.66; 95% CI: 1.42-1.05; $p < 0.10$) to use the health post relative to home care only. In addition, caregivers in West Hararghe (aRRR 1.84; 95% CI: 0.95-3.57; $p < 0.10$) were more likely to use private sources relative to the health post. Household distance from the health post was associated with lower likelihood of using both the health post (aRRR and the health center relative to home care only. Caregivers residing greater than a 30 minute-

walk were approximately half as likely to use both the health post and health center compared to home care only. In contrast, caregivers residing greater than a 30 minute-walk from the health post were approximately twice as likely to use private sources compared to the health post.

3.6 Reported reasons for not seeking care from the HEW/health post

The primary reasons reported by caregivers who did not utilize services from the HEW at the health post (n=2,060) for not using this source for their child's illness are presented in Figure 3. The most common response to this question related to perceptions that the child's illness was not serious enough to go to the health post. Nearly one-third of these caregivers (32.5%) reported this perception. Additional reasons included perceptions that: the health post was not open (20.7%), drugs were not available at the health post (18.7%), the health post was located too far from a caregiver's household to access (16.6%), poor service by the HEW or at the health post (15.0%), preferences for informal treatment (11.2%) and challenges in obtaining transportation to the health post (8.2%).

Comparing caregivers in *woredas* providing iCCM services to caregivers in those providing routine CCM services, highly significant differences ($p < 0.01$) were found for caregivers reporting poor service by the HEW or at the health post and challenges in obtaining transportation to the health post. Higher proportions of caregivers in *woredas* providing routine CCM services reported poor service (18.5%) and transportation challenges (10.8%) as reasons for not using the health post compared to caregivers in *woredas* providing iCCM services (11.5% and 5.6%, respectively). Marginally significant differences ($p < 0.10$) were found for caregivers reporting perceptions that

their child's illness was not serious, with higher proportions reporting this reason for not using the health post in *woredas* providing iCCM services (35.5%) compared to those in *woredas* providing routine CCM services (29.4%). Marginally significant differences ($p < 0.10$) were also found in caregivers stating preferences for informal treatment as a reason for not using the health post with higher proportions of caregivers in *woredas* providing routine CCM services (13.2%) reporting this reason compared to caregivers in *woredas* providing iCCM services (9.3%).

4. Discussion

The study results demonstrate very low rates of utilization (9.3%) of HEWs providing child health treatments by caregivers of children sick with diarrhea, fever and/or pneumonia in rural Oromia region, Ethiopia. There was a marginally higher proportion of caregivers seeking treatment for children sick with diarrhea, fever and/or pneumonia in iCCM *woredas* (10.8%) compared to routine CCM *woredas* (7.7%) at the $p < 0.10$ level. However, this effect was not found to be significant after accounting for potential confounders (aOR 1.33; 95% CI: 0.89-1.97; $p = 0.16$). There were significant differences in the study population between caregivers in routine CCM *woredas* compared to caregivers in iCCM *woredas*. Notably, caregivers in iCCM *woredas* were more likely to be aware of treatments for child illness at the health post and had a greater knowledge of child illness danger signs. While it is likely that the iCCM intervention is leading to increased caregiver knowledge of child illness and awareness of HEW capacities through the added emphasis on child illnesses, it also appears that these improvements may be translating to increased use relative to the routine CCM program.

Moreover, a recent quality of care study conducted in Oromia showed significant improvements in several quality indicators in iCCM *woredas* relative to routine CCM *woredas*.²⁸ As well, it does not appear that quality improvements in iCCM areas have led to increased utilization of HEWs providing iCCM services in rural Oromia health posts after two years of scale up.

There was a differing profile of determinants of utilization of HEWs at the health post comparing iCCM to routine CCM *woredas*. In both areas, previous use and awareness of the availability of treatments at the health post were associated with significantly higher odds for using the health post in unadjusted analyses, but the effect for both was stronger in iCCM *woredas*. The main differences found consisted of higher odds for utilization of health post services in iCCM *woredas* for: younger mothers, mothers with no education and children with pneumonia compared routine CCM *woredas*. This suggests that the iCCM strategy is potentially reaching some groups typically facing barriers to accessing evidence-based child health treatments and that the inclusion of pneumonia in iCCM is leading to more community-based treatment for this illness. However, the effect of increasing distance of a caregiver and child's household from the health post on decreasing odds for using the health post was more apparent in iCCM *woredas* and children under the age of one year were significantly less likely to be taken to the health post—relationships that were not seen in routine CCM *woredas*. The finding of a strong effect for distance is troubling and suggests that the iCCM strategy is not addressing geographic challenges to use of evidence-based child health treatments in community settings. It is possible that the added responsibilities of HEWs in the iCCM strategy could be interfering with their ability to extend services to households distant

from the health post, particularly in their demand generation and community mobilization activities. The finding that children less than one year of age significantly less likely to be taken to the health post is likely related to cultural beliefs relating the increased vulnerability of a new mother and newborn and restrictions on a mother from leaving the household to seek care. This phenomenon has been observed in rural Ethiopia and described elsewhere.²⁹ It is unclear why this effect was not seen in routine CCM settings with similar sociocultural characteristics. No effects were found for household wealth in both areas. This may be related to the relatively small differences in assets between the wealthiest and poorest households. Education status has been suggested as a better proxy for socioeconomic status in rural Ethiopia.^{23,30} Taking maternal education as a proxy for socioeconomic status, it appears that iCCM is targeting lower socioeconomic households relative to the routine CCM program, potentially increasing equity of access.

It is not clear that the iCCM strategy is associated with increases in utilization of appropriate sources of care as opposed to shifts in patterns of use within appropriate sources. The study results demonstrate that there are no differences in utilization of trained health providers between routine CCM and iCCM areas. Nonetheless, as the multinomial logistic regression models suggest, the iCCM strategy is leading to increased use of HEWs at the health posts compared to higher levels of care—which is not seen in CCM *woredas*. There are positive effects associated with this finding such as decreasing the burden on higher levels of care and reducing the financial and distance burdens for caregivers associated with utilizing sources outside of local communities. Maternal education was a significant predictor of substitution patterns with caregivers with higher

education status significantly more likely to bypass the health post for treatment at health centers and private facilities.

A number of studies have demonstrated the effectiveness of interventions involving CHWs in SSA. These studies show that CHWs influence care-seeking behavior and improve access to appropriate treatment of common childhood illnesses, particularly in hard-to-reach, poor and underserved settings.³¹⁻³⁵ However, the ability of CHWs to achieve these objectives is dependent on their use by caregivers of sick children. Recent studies on CHW programs in SSA show varying levels of CHW utilization for childhood diarrhea, fever and pneumonia, ranging from 26-78%.³⁶⁻⁴¹ Our finding that only 9.3% of caregivers of sick children using HEWs in rural Oromia are significantly lower in comparison to these other settings. This low utilization occurs despite the provision of free services provided in local, community settings and status of HEWs as paid government employees—intervention actions designed to minimize common barriers affecting CHW programs and their utilization.^{34,42} Use of HEWs has generally been found to be significantly higher in other regions of Ethiopia compared to Oromia.⁴³⁻⁴⁵ This might potentially be related to the sociopolitical context of Oromia which has been the site of a low-level civil conflict with the federal government of Ethiopia. However, these studies did not focus particularly on use of HEWs for child illness and health service utilization studies in Ethiopia have generally found low levels of appropriate sources of care for common childhood illnesses.⁸⁻¹⁰ These studies and other indicate that factors, such as awareness and perception, literacy, family size, educational status, perceived illness, family income, media exposure, perception of distance to health facilities, perceived transport and treatment costs are some of the predictor factors for use

of public services.⁴⁶⁻⁴⁸ Similarly, we found awareness, maternal education, illness type and distance as significant predictors of use of HEWs in rural Oromia.

Other recent studies focusing on care seeking in the context of available CCM and iCCM services have found both distance and household wealth status as significant predictors for use of CHWs providing these services. In Uganda, Mukanga et al.³⁸ found decreased distance from a caregiver's household to a CHW was a significant factor for utilizing CHWs providing rapid diagnostic testing for malaria. In another study in Uganda Kalyango et al.³⁷ found that CHW utilization was associated with lower household wealth and increased knowledge of child illness danger signs. Similarly, in Kenya Kisia et al.³⁶ found poorer households more likely to use CHWs providing CCM for malaria compared to the wealthiest households. Two recent studies by Kalyango et al.³⁷ and Seidenberg et al.⁴⁹ looked at utilization of CHWs providing different models of community case management of common childhood illnesses. In Uganda, Kalyango et al.³⁷ found significantly higher use of community medicine distributors in iCCM of pneumonia and malaria compared to areas providing CCM for malaria only. In Zambia, Seidenberg et al.⁴⁹ found significant increases in use of CHWs in both areas providing iCCM of malaria and pneumonia and areas providing CCM of malaria from baseline to endline, but the differences in utilization between iCCM and CCM areas at endline were not significant. As a secondary outcome, both of these studies found higher knowledge of child danger signs in caregivers in iCCM areas compared to those in CCM areas. Similar to these two studies, our study evaluated the inclusion of pneumonia and additional iCCM trainings and support for CHWs approximately two years after implementation relative to national routine CCM programs. While the findings are mixed on whether the

addition of iCCM improves utilization of CHWs, these two studies in addition to our findings suggest that the inclusion of additional child treatment responsibilities for CHWs does not lead to decreases in utilization of CHWs. Furthermore, in both Uganda and Zambia, the authors found evidence for substitution of higher-level public and private facilities with treatments from CHWs in iCCM areas, decreasing burdens on both caregivers and these facilities.

The strategy of iCCM is expected to improve policy support, quality, access and demand for child health services and treatments for common childhood illnesses from trained CHWs, improve equity in access to evidence-based treatments and reduce under-five mortality.⁵⁰ There are some indications that the iCCM strategy is providing increased access for marginalized populations such as uneducated caregivers and promoting equity. However, the low utilization seen in this study suggests that there are still access challenges such as distance of a household from a health post and overall level of demand is generally low. In addition, the findings relevant to education and outreach activities aimed at awareness of child illness are mixed. While caregivers in iCCM areas were more aware of the availability of treatments and child illness danger signs, nearly one-third of caregivers who did not use the health post in both areas stated that they did not use the health post due to low perceptions of severity of their child's illness—despite being reported sick with diarrhea, fever and/or pneumonia. Furthermore, many caregivers who did not use the health post in iCCM areas suggested perceptions of a lack of drugs and expectation of poor service at the health post as reasons for not using iCCM services provided by the HEWs—despite a study suggesting significant improvements in these

areas.²⁸ This suggests that perceptions of quality of services are lagging behind rapid improvements taking place as part of the iCCM scale up.

There is an urgent need to improve education and demand generation activities as part of the iCCM strategy in rural Ethiopia and to target these activities to populations most in need. Currently, there are few guidelines for demand generation in the iCCM scale-up strategy.⁵⁰ In Ethiopia, there is a unique opportunity to shift demand generation activities and decrease the workload of HEWs in the Health Development Army initiative—a new cadre of volunteer community health aide consisting of one woman from every five rural households trained in demonstrating “model health behaviors” to their communities. Furthermore, geographic barriers should be addressed in the siting of health posts, through active case-finding and treatment within the households by HEWs and members of the Health Development Army, targeting of distant sub-villages and innovative community-based transportation actions. These activities, especially active case finding and treating children within the home, might potentially reach young children who would not otherwise be taken for treatment outside the household. There is also need for further research on caregiver perceptions of severity, the HEW and service-related factors that might be associated with use of health post services to get a better understanding of additional determinants of utilization in this setting.

There were some limitations associated with this study. The study was cross-sectional and we were unable to look at changes over time and seasonality might have introduced biases related to the types of illness reported and access/care seeking (much of the survey took place during the rainy season). Self-reported symptoms were used to classify sick children and thus children may have been misclassified. However, this was

followed with a series of further questions about the illness potentially minimizing this possibility. Bias in recall was a potential problem in this study with caregivers being asked to remember things that happened in the past about an event that may not have been a major event in the home. This was minimized by limiting the recall period to two weeks. Interviewer and social desirability was potentially introduced and may have impacted reporting of use of particular sources of care.

References

1. UNICEF. *Committing to Child Survival: A Promise Renewed Progress Report 2013*. New York: UNICEF; 2013.
2. Central Statistical Agency [Ethiopia], ORC Macro. *Ethiopia Demographic and Health Survey 2011*. Addis Ababa, Calverton: Central Statistical Agency [Ethiopia], ORC Macro; 2012.
3. Liu L, Johnson HL, Cousens S, Perin J, Scott S, Lawn JE, et al. Global, regional, and national causes of child mortality: an updated systematic analysis for 2010 with time trends since 2000. *Lancet*. 2012; **379**(9832): 2151-61.
4. Black RE, Cousens S, Johnson HL, Lawn JE, Rudan I, Bassani DG, et al. Global, regional, and national causes of child mortality in 2008: a systematic analysis. *Lancet*. 2010; **375**(9730): 1969-87.
5. Bhutta ZA, Chopra M, Axelson H, Berman P, Boerma T, Bryce J, et al. Countdown to 2015 decade report (2000–10): taking stock of maternal, newborn, and child survival. *Lancet*. 2010; **375**(9730): 2032-44.
6. Kinney MV, Kerber KJ, Black RE, Cohen B, Nkrumah F, Coovadia H, et al. Sub-Saharan Africa's mothers, newborns, and children: where and why do they die? *PLoS Medicine*. 2010; **7**(6): e1000294.
7. Banteyerga H. Ethiopia's health extension program: improving health through community involvement. *MEDICC Review*. 2011; **13**(3): 46-9.
8. Mebratie AD, Van de Poel E, Yilma Z, Abebaw D, Alemu G, Bedi AS. Healthcare-seeking behaviour in rural Ethiopia: evidence from clinical vignettes. *BMJ Open*. 2014; **4**(2): e004020.

9. Deressa W. Treatment-seeking behavior for febrile illness in an area of seasonal malaria transmission rural Ethiopia. *Malaria Journal*. 2007; **6**(1): 49.
10. Deressa W, Ali A, Berhane Y. Household and socioeconomic factors associated with childhood febrile illnesses and treatment seeking behavior in an area of epidemic malaria in rural Ethiopia. *Transactions of the Royal Society of Tropical Medicine and Hygiene*. 2007; **101**(9), 939-47.
11. Federal Ministry of Health of Ethiopia (FMoH). *Health Extension Program in Ethiopia*. Addis Ababa: FMoH; 2007.
12. Teklehaimanot HD, Teklehaimanot A. Human resource development for a community-based health extension program: a case study from Ethiopia. *Human Resources for Health*. 2013; **11**(1): 39.
13. Government of Ethiopia, Federal Ministry of Health. *Health Sector Development Program, 2010/11-2014/15*. Addis Ababa: Government of Ethiopia, Federal Ministry of Health; 2011.
14. Mela Research, PLC. *Baseline Coverage Survey for the Independent Prospective Evaluation of the Integrated Community Case Management (ICCM) in Oromia Region, Ethiopia: Draft Report*. Addis Ababa: Mela Research, PLC; 2011.
15. The Last Ten Kilometers Project (L10K). *Changes in Maternal, Newborn and Child Health in 115 Rural Woredas of Amhara, Oromia, SNNP and Tigray Regions of Ethiopia, 2008-2010: Findings from the L10K Baseline and Midterm Surveys*. Addis Ababa: John Snow International (JSI); 2012.
16. Fantahun M, Degu G. Health service utilization in Amhara region of Ethiopia. *Ethiopian Journal of Health Development*. 2003; **17**(2): 141-7.

17. Assefa T, Belachew T, Tegegn A. Mothers' health care seeking behavior for childhood illnesses in Derra District, Northshoa Zone, Oromia Regional State, Ethiopia. *Ethiopian Journal of Health Sciences*. 2008; **18**(3): 87-94.
18. Andersen RM, Newman JF. Social and individual determinants of medical care utilization in the United States. *Milbank Memorial Quarterly*. 1973; **51**(1): 95-124.
19. Kroeger A. Anthropological and sociomedical health care research in developing countries. *Social Science and Medicine*. 1983; **17**(3): 47-161.
20. Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? *Journal of Health and Social Behavior*. 1995; **36**(1): 1-10.
21. Ricketts TC, Goldsmith LJ. Access in health services research: the battle of the frameworks. *Nursing Outlook*. 2005; **53**(6): 274-80.
22. Filmer D, Pritchett L. 2001. Estimating wealth effects without expenditure data - or tearsan application to educational enrollments in states of India. *Demography*. 2001; **38**(1): 85-120.
23. Agho KE, Dibley MJ, Odiase JI, Ogbonmwan SM. Determinants of exclusive breastfeeding in Nigeria. *BMC Pregnancy and Childbirth*. 2011; **11**: 2.
24. Noor A, Amin A, Gething P, Atkinson PM, Hay SI, Snow RW. Modelling distances travelled to government health services in Kenya. *Tropical Medicine and International Health*. 2006; **11**(2): 188-96.
25. Rutherford ME, Dockerty JD, Jasseh M, Howie SR, Herbison P, Jeffries DJ, et al. Access to health care and mortality of children under 5 years of age in the Gambia: a case-control study. *Bulletin of the World Health Organization*. 2009; **87**(3): 216-24.

26. CORE Group, Save the Children, BASICS, MCHIP. *Community Case Management Essentials: Treating Common Childhood Illnesses in the Community. A Guide for Program Managers*. Washington, DC: CORE Group, Save the Children, BASICS, MCHIP; 2010.
27. Cochran WG. *Sampling Techniques*. 3rd ed. New York: Wiley; 1977.
28. Miller NP, Amouzou A, Tafesse M, Hazel E, Legesse H, Degefie T, et al. Integrated community case management of childhood illness in Ethiopia: implementation strength and quality of care. *American Journal of Tropical Medicine and Hygiene*. 2014; [Epub ahead of print].
29. Callaghan-Koru JA, Seifu A, Tholandi M, de Graft-Johnson J, Daniel E, Rawlins B, et al. Newborn care practices at home and in health facilities in 4 regions of Ethiopia. *BMC Pediatrics*. 2013; **13**: 198.
30. Doocy S, Burnham G. Assessment of socioeconomic status in the context of food insecurity: implications for field research. *World Health and Population*, 2006; **8**(3): 32-42.
31. Perez F, Ba H, Dastagire SG, Altmann M. The role of community health workers in improving child health programs in Mali. *BMC International Health and Human Rights*. 2009; **9**: 28.
32. Brenner JL, Kabakyenga J, Kyomuhangi T, Wotton KA, Pim C, Ntaro M, et al. Can volunteer health workers decrease child morbidity and mortality in Southwestern Uganda? An impact evaluation. *PLoS One*. 2011; **6**(12): e27997.

33. Perry HB, Zulliger R, Rogers MM. Community health workers in low-, middle-, and high-income countries: an overview of their history, recent evolution, and current effectiveness. *Annual Review of Public Health*. 2014; **35**: 399-421.
34. Lehmann U, Sanders D. *Community Health Workers: What Do We Know About Them? The State of the Evidence on Programs, Activities, Costs and Impact on Health Outcomes of Using Community Health Workers*. Geneva: WHO; 2007.
35. Lewin S, Munabi-Babigumira S, Glenton C, Daniels K, Bosch-Capblanch X, van Wyk BE, et al. Lay health workers in primary and community health care for maternal and child health and the management of infectious diseases. *Cochrane Database of Systematic Reviews*. 2010; 3: CD004015.
36. Kisia J, Nelima F, Otieno DO, Kiilu K, Emmanuel W, Sohani S, et al. Factors associated with utilization of community health workers in improving access to malaria treatment among children in Kenya. *Malaria Journal*. 2012; **11**: 248.
37. Kalyango JN, Lindstrand A, Rutebemberwa E, Ssali S, Kadobera D, Karamagi C, et al. Increased use of community medicine distributors and rational use of drugs in children less than five years of age in Uganda caused by integrated community case management of fever. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 36-45.
38. Mukanga D, Tibenderana JK, Peterson S, Pariyo GW, Kiguli J, Waiswa P, et al. Access, acceptability and utilization of community health workers using diagnostics for case management of fever in Ugandan children: a cross-sectional study. *Malaria Journal*. 2012; **11**: 121.

39. Rutebemberwa E, Kadobera D, Katureebe S, Kalyango JN, Mworozzi E, Pariyo G. Use of community health workers for management of malaria and pneumonia in urban and rural areas in eastern Uganda. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 30-5.
40. Ajayi IO, Browne EN, Garshong B, Bateganya F, Yusuf B, Agyei-Baffour P, et al. Feasibility and acceptability of artemisinin-based combination therapy for the home management of malaria in four African sites. *Malaria Journal*. 2008; **7**: 6.
41. Onwujekwe O, Dike N, Ojukwu J, Uzochukwu B, Ezumah N, Shu E, et al. Consumers stated and revealed preferences for community health workers and other strategies for the provision of timely and appropriate treatment of malaria in southeast Nigeria. *Malaria Journal*. 2006; **5**: 117.
42. Rutebemberwa E, Pariyo G, Peterson S, Tomson G, Kallander K, 2009. Utilization of public or private health care providers by febrile children after user fee removal in Uganda. *Malaria Journal*. 2009; **8**: 45.
43. Yitayal M, Berhane Y, Worku A, Kebede Y. Health extension program factors, frequency of household visits and being model households, improved utilization of basic health services in Ethiopia. *BMC Health Services Research*. 2014; **14**: 156.
44. Sebastian MS, Lemma H. Efficiency of the health extension programme in Tigray, Ethiopia: a data envelopment analysis. *BMC International Health and Human Rights*. 2010; **10**: 16.
45. Teklehaimanot HD, Teklehaimanot A. Human resource development for a community-based health extension program: a case study from Ethiopia. *Human Resources for Health*. 2013; **11**(1): 39.

46. Worku AG, Yalew AW, Afework MF. Factors affecting utilization of skilled maternal care in Northwest Ethiopia: a multilevel analysis. *BMC International Health and Human Rights*. 2013; **13**: 20.
47. Birmeta K, Dibaba Y, Woldeyohannes D. Determinants of maternal health care utilization in Holeta town, central Ethiopia. *BMC Health Services Research*. 2013; **13**: 256.
48. Medhanyie A, Spigt M, Kifle Y, Schaay N, Sanders D, Blanco R, et al. The role of health extension workers in improving utilization of maternal health services in rural areas in Ethiopia: a cross sectional study. *BMC Health Services Research*. 2012; **12**: 352.
49. Seidenberg PD, Hamer DH, Iyer H, Pilingana P, Siazele K, Hamainza B, et al. Impact of integrated community case management on health-seeking behavior in rural Zambia. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 105-10.
50. Marsh DR, Hamer DH, Pagnoni F, Peterson S. Introduction to a special supplement: evidence for the implementation, effects, and impact of the integrated community case management strategy to treat childhood infection. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 2-5.

Table 1: Comparison between routine CCM and iCCM guidelines and inputs in Ethiopia

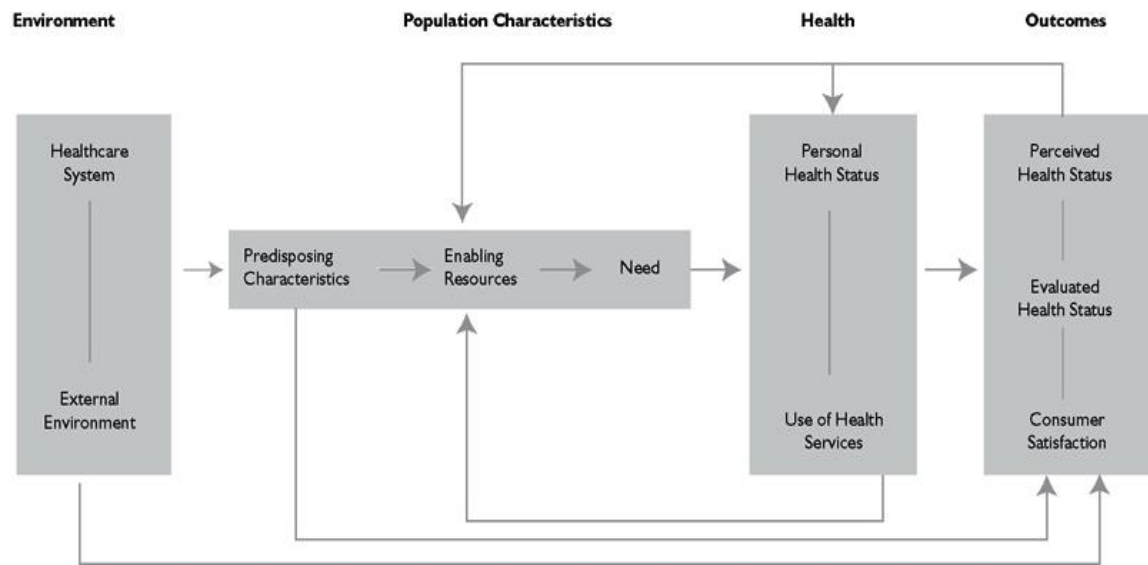
	Routine CCM	iCCM
Management of iCCM illnesses for children 2-59 months		
Pneumonia	<ul style="list-style-type: none"> Referral to health center 	<ul style="list-style-type: none"> Cotrimoxazole
Severe pneumonia	<ul style="list-style-type: none"> Referral to health center 	<ul style="list-style-type: none"> Pre-referral treatment with cotrimoxazole
Diarrhea (no/some dehydration)	<ul style="list-style-type: none"> ORS^a/ORT^b 	<ul style="list-style-type: none"> ORS/ORT Zinc
Severe diarrhea (severe dehydration, persistent diarrhea, severe persistent diarrhea, dysentery)	<ul style="list-style-type: none"> ORS Vitamin A (for persistent and severe persistent diarrhea only) Referral to health center 	<ul style="list-style-type: none"> ORS Vitamin A (for persistent and severe persistent diarrhea only) Referral to health center
Malaria	<ul style="list-style-type: none"> Antimalarial 	<ul style="list-style-type: none"> Antimalarial
Severe febrile disease	<ul style="list-style-type: none"> Referral to health center 	<ul style="list-style-type: none"> Pre-referral treatment with cotrimoxazole Referral to health center
Uncomplicated malnutrition	<ul style="list-style-type: none"> RUTF or supplementary feeding program 	<ul style="list-style-type: none"> RUTF or supplementary feeding program
Severe complicated malnutrition	<ul style="list-style-type: none"> Pre-referral treatment with amoxicillin and vitamin A Referral to health center 	<ul style="list-style-type: none"> Pre-referral treatment with amoxicillin and vitamin A Referral to health center
Program inputs		
Training	<ul style="list-style-type: none"> No additional training 	<ul style="list-style-type: none"> 6-day training on iCCM
Supervision	<ul style="list-style-type: none"> Standard government supervision 	<ul style="list-style-type: none"> Standardized supportive supervision on iCCM supported by partner NGOs plus standard government supervision Bi-annual performance review and clinical mentoring meetings (PRCM)
Supply of commodities	<ul style="list-style-type: none"> Standard government commodity supply chain system No additional supplies or job aids 	<ul style="list-style-type: none"> Support for purchase and supply of drugs and other commodities by UNICEF and partners Provision of iCCM registers, iCCM chart booklets, timers and other supplies
Monitoring and evaluation	<ul style="list-style-type: none"> Standard government monitoring and evaluation 	<ul style="list-style-type: none"> Enhanced data collection during supervisions and PRCM meetings Data management support by UNICEF

^a Oral rehydration solution

^b Oral rehydration therapy

Source: UNICEF Ethiopia

Figure 1: Andersen's Health Services Utilization Model



Source: Andersen RM, 1995

Table 2: Selected characteristics of communities, caregivers and their children reported sick with diarrhea, fever and/or pneumonia in the two weeks preceding the survey, Jimma and West Hararghe zones, Oromia region, Ethiopia, 2013 for total sick children (N=2,248) and by type of child health service available in a caregiver's community

Variables	Total sick children N (%) ^{ab}	Routine CCM n (%) ^b	iCCM n (%) ^b	p-value
Number of children	2248 (100)	1247 (49.2)	1001 (50.8)	
<i>Predisposing characteristics</i>				
Religion				0.537
Muslim	1939 (92.2)	1053 (91.5)	886 (92.9)	
Christian	224 (7.8)	149 (8.5)	75 (7.1)	
Household size in number of members				0.298
≤ 3	204 (9.2)	105 (8.3)	99 (10.0)	
4-6	1133 (48.9)	622 (47.7)	511 (50.0)	
≥ 7	911 (41.9)	520 (44.0)	391 (40.0)	
Maternal age in years				0.502
15-19	98 (4.3)	56 (4.5)	42 (4.2)	
20-29	1111 (49.9)	617 (49.1)	494 (50.7)	
30-39	769 (36.4)	415 (35.6)	354 (37.2)	
40-49	188 (9.4)	117 (10.8)	71 (7.9)	
Maternal education				0.770
None	1724 (78.6)	959 (78.2)	765 (79.0)	
Some formal	442 (21.4)	246 (21.8)	196 (21.0)	
Previous use of HP services				0.459
Never used	1239 (70.2)	695 (71.4)	544 (69.0)	
Used	504 (29.8)	281 (28.6)	223 (31.1)	
Child gender				0.830
Male	1187 (52.1)	662 (52.4)	525 (51.9)	
Female	1061 (47.9)	585 (47.6)	476 (48.1)	
<i>Enabling characteristics</i>				
Zone of residence				0.189
Jimma	1364 (63.7)	747 (61.4)	617 (66.0)	
West Hararghe	884 (36.3)	500 (38.6)	384 (34.1)	
Household distance to the HP in minutes travel time				0.456
0-30	805 (37.7)	471 (39.5)	334 (35.9)	
31-60	591 (26.6)	328 (26.1)	263 (27.0)	
61-120	561 (24.4)	315 (24.8)	246 (23.9)	
> 120	288 (11.4)	131 (9.6)	157 (13.2)	
Household wealth				*0.042
Poorest 40%	1083 (44.0)	603 (43.6)	480 (44.4)	
Middle 40%	833 (38.8)	482 (42.0)	351 (35.7)	
Wealthiest 20%	332 (17.2)	162 (14.4)	170 (19.9)	
Awareness of child health services at HP				*0.005
Not aware	1027 (56.9)	598 (62.7)	429 (51.4)	
Aware	719 (43.1)	381 (37.3)	338 (48.6)	
<i>Need characteristics</i>				
Maternal knowledge of danger signs in number of IMCI signs reported				*0.027
0	230 (9.4)	151 (11.5)	79 (7.4)	
1-2	908 (39.7)	517 (43.0)	470 (36.6)	
≥ 3	1110 (50.9)	579 (45.5)	531 (56.1)	

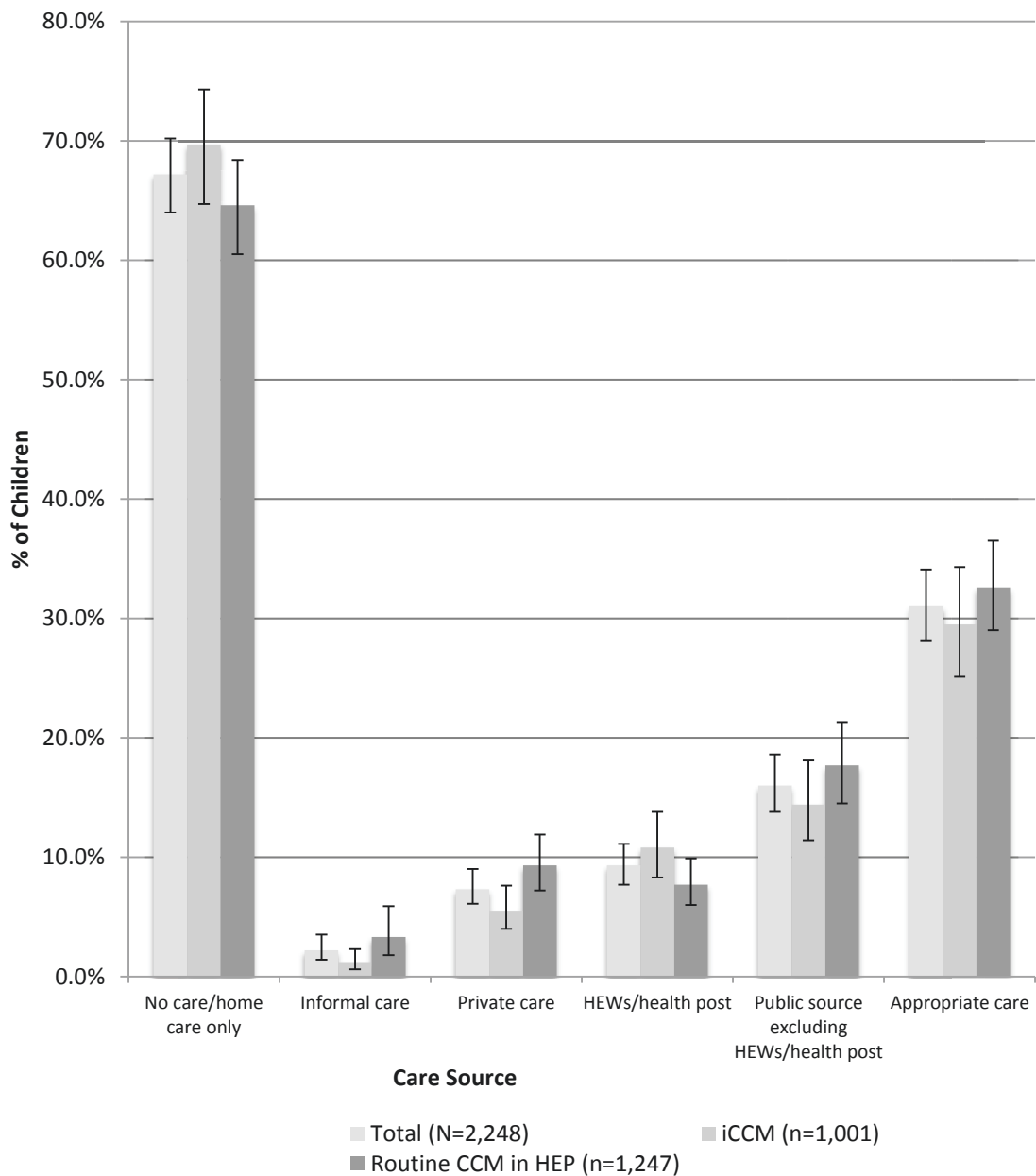
Experienced previous child death				0.931
No	1441 (66.4)	793 (66.6)	648 (66.3)	
Yes	712 (33.6)	404 (33.5)	308 (33.7)	
Child age in years				0.502
< 1	419 (18.7)	236 (19.9)	183 (17.5)	
1	470 (21.0)	241 (19.4)	229 (22.6)	
2	492 (22.2)	281 (21.9)	211 (22.5)	
3	470 (21.2)	264 (21.4)	206 (21.0)	
4	391 (17.0)	222 (17.5)	169 (16.5)	
Illness type				0.367
Reported diarrhea only	507 (23.2)	280 (23.9)	227 (22.5)	
Reported pneumonia	577 (24.4)	334 (25.8)	243 (23.1)	
Other	1164 (52.4)	633 (50.3)	531 (52.4)	

a. The number of missing values may vary for each variable. The percentages presented are valid percentages.

b. The percentage is adjusted for sample weight, multi-staging and cluster weight. Therefore, the percentage may not be equal to simple unweighted count.

*Statistically significant association in Chi-square test at $p < 0.05$ level.

Figure 2: Care-seeking sources utilized for children reported sick with diarrhea, fever and/or pneumonia in the two weeks preceding the survey, Jimma and West Hararghe zones, Oromia region, Ethiopia, 2013 (N=2,248)^a



a. 1.5% of caregivers reported the use of multiple sources

Table 3: Logistic regression models comparing utilization of the HEW/health post for children reported sick with diarrhea, fever and/or pneumonia in communities receiving routine CCM and communities receiving iCCM child health services

	Bivariate OR ^a (95% CI ^b)	Multivariate aOR ^c (95% CI)		
		Model 1 ^d	Model 2 ^e	Model 3 ^f
<i>Routine CCM</i>	1.00	1.00	1.00	1.00
<i>iCCM</i>	*1.44 (0.97-2.12) p = 0.067	1.35 (0.91-2.00) p = 0.132	1.35 (0.91-1.99) p = 0.137	1.33 (0.89-1.97) p = 0.160

a. OR = unadjusted odds ratio

b. aOR = adjusted odds ratio

c. CI = confidence interval

d. Model 1 includes predisposing characteristics

e. Model 2 includes predisposing + enabling characteristics

f. Model 3 includes predisposing + enabling + need characteristics

*Statistically significant association at p < 0.10 level

Table 4: Results of bivariate analyses for selected study sample characteristics and utilization of the HEW/health post for children reported sick with diarrhea, fever and/or pneumonia for the total sample and by type of child health services available in a caregiver's community

Variables	Total OR ^a (95% CI) ^b	Routine CCM OR (95% CI)	iCCM OR (95% CI)
<i>Predisposing characteristics</i>			
Religion			
Muslim	1.00	1.00	1.00
Christian	1.14 (0.60-2.17)	1.27 (0.62-2.60)	1.06 (0.36-3.10)
Household size in number of members			
≤ 3	1.00	1.00	1.00
4-6	0.93 (0.50-1.75)	1.81 (0.57-5.78)	0.71 (0.34-1.49)
≥ 7	0.80 (0.42-1.52)	1.61 (0.51-5.09)	0.59 (0.27-1.32)
Maternal education			
None	1.00	1.00	1.00
Some formal	0.79 (0.50-1.26)	0.96 (0.46-2.02)	0.68 (0.38-1.20)
Child gender			
Male	1.00	1.00	1.00
Female	1.10 (0.77-1.57)	0.92 (0.55-1.52)	1.24 (0.75-2.05)
Maternal age in years			
15-19	0.53 (0.19-1.48)	*0.07 (0.01-0.51)	0.88 (0.29-2.60)
20-29	1.00	1.00	1.00
30-39	1.02 (0.71-1.47)	1.29 (0.82-2.03)	0.86 (0.49-1.49)
40-49	0.67 (0.32-1.40)	0.98 (0.32-2.60)	0.98 (0.15-1.46)
<i>Enabling characteristics</i>			
Zone of residence			
Jimma	1.00	1.00	1.00
West Hararghe	*0.70 (0.47-1.04)	0.87 (0.51-1.49)	*0.60 (0.33-1.07)
Household distance to the HP ^a in minutes travel time			
0-30	1.00	1.00	1.00
31-60	*0.66 (0.42-1.04)	*0.52 (0.42-1.04)	0.71 (0.40-1.25)
61-120	**0.61 (0.39-0.95)	1.13 (0.62-2.06)	***0.33 (0.16-0.68)
> 120	**0.55 (0.30-0.99)	1.16 (0.55-2.42)	***0.28 (0.11-0.71)
Household wealth			
Poorest 40%	1.00	1.00	1.00
Middle 40%	1.03 (0.71-1.52)	0.87 (0.51-1.50)	1.22 (0.72-2.08)
Wealthiest 20%	1.13 (0.75-1.70)	1.21 (0.58-2.53)	1.05 (0.65-1.71)
<i>Need characteristics</i>			
Experienced previous child death			
No	1.00	1.00	1.00
Yes	0.79 (0.52-1.19)	0.97 (0.60-1.57)	0.67 (0.35-1.27)
Child age in years			
< 1	0.61 (0.33-1.13)	1.33 (0.59-3.00)	***0.29 (0.13-0.66)
1	1.00	1.00	1.00
2	1.08 (0.62-1.87)	1.55 (0.76-3.15)	0.90 (0.42-1.90)
3	0.85 (0.49-1.47)	1.24 (0.63-2.42)	0.71 (0.33-1.53)
4	0.96 (0.48-1.93)	0.89 (0.37-2.12)	1.07 (0.42-2.72)
Illness type			
Reported diarrhea only	1.00	1.00	1.00
Reported pneumonia	1.30 (0.82-2.05)	0.70 (0.38-1.31)	**2.17 (1.12-4.22)
Other	0.96 (0.60-1.52)	0.68 (0.37-1.25)	1.29 (0.64-2.61)

a. OR = unadjusted odds ratio

b. CI = confidence interval

c. HP = health post

* Statistically significant at the p < 0.10 level

** Statistically significant at the p < 0.05 level

*** Statistically significant at the p < 0.01 level

Table 5: Results of multivariate logistic regression models predicting individual likelihood of utilization of the HEW/health post for children reported sick with diarrhea, fever and/or pneumonia stratified into communities receiving routine CCM child health services and communities receiving iCCM child health services

Variables	Routine CCM Available in Community			iCCM Available in Community		
	Model 1 ^a aOR ^d (95% CI) ^e	Model 2 ^b aOR (95% CI)	Model 3 ^c aOR (95% CI)	Model 1 ^a aOR (95% CI)	Model 2 ^b aOR (95% CI)	Model 3 ^c aOR (95% CI)
<i>Predisposing characteristics</i>						
Religion						
Muslim	1.00	1.00	1.00	1.00	1.00	1.00
Christian	1.22 (0.61-2.44)	1.18 (0.58-2.39)	1.23 (0.59-2.57)	1.08 (0.38-3.09)	0.93 (0.35-2.46)	0.82 (0.28-2.45)
Household size in number of members						
≤ 3	1.00	1.00	1.00	1.00	1.00	1.00
4-6	1.07 (0.31-3.68)	1.10 (0.33-3.67)	1.19 (0.35-4.09)	0.61 (0.28-1.32)	0.62 (0.28-1.38)	0.61 (0.27-1.39)
≥ 7	0.78 (0.24-2.55)	0.78 (0.24-2.51)	0.84 (0.26-2.73)	0.55 (0.23-1.29)	0.56 (0.23-1.32)	0.56 (0.23-1.35)
Maternal education						
None	1.00	1.00	1.00	1.00	1.00	1.00
Some formal	1.08 (0.50-2.35)	1.03 (0.44-2.43)	1.05 (0.44-2.48)	*0.59 (0.34-1.03)	**0.50 (0.29-0.86)	***0.46 (0.26-0.79)
Child gender						
Male	1.00	1.00	1.00	1.00	1.00	1.00
Female	0.93 (0.56-1.56)	0.92 (0.56-1.53)	0.90 (0.54-1.51)	1.28 (0.76-2.16)	1.32 (0.79-2.22)	1.28 (0.76-2.15)
Maternal age in years						
15-19	**0.06 (0.01-0.58)	**0.07 (0.01-0.61)	**0.06 (0.01-0.58)	0.85 (0.25-2.83)	0.94 (0.29-3.03)	1.23 (0.35-4.29)
20-29	1.00	1.00	1.00	1.00	1.00	1.00
30-39	1.51 (0.84-2.73)	1.46 (0.81-2.65)	1.55 (0.83-2.91)	0.94 (0.49-1.77)	0.93 (0.48-1.80)	0.90 (0.46-1.76)
40-49	1.22 (0.44-3.35)	1.18 (0.43-3.25)	1.32 (0.44-3.91)	0.50 (0.14-1.76)	0.45 (0.12-1.68)	0.46 (0.12-1.71)
<i>Enabling characteristics</i>						
Zone of residence						
Jimma		1.00	1.00		1.00	1.00
West Hararghe		0.87 (0.47-1.61)	0.87 (0.46-1.63)		0.58 (0.29-1.18)	0.65 (0.32-1.33)
Household distance to the HP in minutes travel time						
0-30		1.00	1.00		1.00	1.00
31-60		*0.51 (0.24-1.05)	*0.51 (0.24-1.07)		0.69 (0.38-1.23)	0.71 (0.41-1.23)
61-120		1.05 (0.57-1.93)	1.04 (0.56-1.94)		***0.31 (0.15-0.63)	***0.31 (0.15-0.69)
> 120		1.14 (0.56-2.34)	1.13 (0.55-2.31)		**0.29 (0.11-0.75)	***0.29 (0.11-0.73)
Household wealth						
Poorest 40%		1.00	1.00		1.00	1.00
Middle 40%		0.80 (0.47-1.45)	0.82 (0.46-1.46)		0.96 (0.54-1.70)	1.05 (0.57-1.92)
Wealthiest 20%		1.16 (0.49-2.76)	1.13 (0.45-2.82)		0.87 (0.44-1.71)	1.00 (0.49-2.07)

<i>Need characteristics</i>		
Experienced previous child death		
No	1.00	1.00
Yes	0.83 (0.47-1.47)	0.74 (0.40-1.38)
Child age in years		
< 1	1.31 (0.55-3.14)	***0.31 (0.13-0.74)
1	1.00	1.00
2	1.37 (0.64-2.93)	0.94 (0.41-2.16)
3	1.22 (0.59-2.52)	0.85 (0.39-1.87)
4	0.84 (0.34-2.07)	1.26 (0.46-3.50)
Illness type		
Diarrhea only	1.00	1.00
Any pneumonia	0.70 (0.38-1.28)	***2.69 (1.30-5.56)
Other	0.68 (0.37-1.26)	1.52 (0.69-3.32)

a. Model 1 includes predisposing characteristics

b. Model 2 includes predisposing + enabling characteristics

c. Model 3 includes predisposing + enabling + need characteristics

d. aOR = adjusted odds ratio

e. CI = confidence interval

f. HP = health post

* Significant at the $p < 0.10$ level

** Significant at the $p < 0.05$ level

*** Significant at the $p < 0.01$ level

Table 6: Results of multinomial logistic regression models predicting likelihood of utilization for comparisons between selected sources of care for children reported sick with diarrhea, fever and/or pneumonia^a

	HP ^b /Home care only ^c	HC ^d /Home care only	Private/Home care only	HC/HP	Private/HP	HC/Private
Variables	aRRR ^e (95% CI)	aRRR (95% CI)	aRRR (95% CI)	aRRR (95% CI)	aRRR (95% CI)	aRRR (95% CI)
Type of child health services						
Routine CCM	1.00	1.00	1.00	1.00	1.00	1.00
iCCM	1.21 (0.81-1.83)	0.79 (0.54-1.15)	***0.53 (0.33-0.85)	*0.65 (0.39-1.09)	***0.44 (0.25-0.76)	1.47 (0.85-2.57)
Maternal education						
None	1.00	1.00	1.00	1.00	1.00	1.00
Some formal	0.84 (0.51-1.39)	***1.69 (1.20-2.38)	***2.41 (1.56-3.73)	**2.01 (1.13-3.59)	***2.86 (1.60-5.12)	0.70 (0.42-1.18)
Child gender						
Male	1.00	1.00	1.00	1.00	1.00	1.00
Female	1.10 (0.76-1.59)	0.80 (0.59-1.08)	0.77 (0.51-1.15)	0.72 (0.47-1.12)	0.70 (0.41-1.19)	1.03 (0.62-1.72)
Zone of residence						
Jimma	1.00	1.00	1.00	1.00	1.00	1.00
West Hararghe	*0.66 (0.42-1.05)	0.75 (0.51-1.10)	1.22 (0.72-2.08)	1.13 (0.66-2.01)	*1.84 (0.95-3.57)	0.61 (0.33-1.14)
Household wealth						
Poorest 40%	1.00	1.00	1.00	1.00	1.00	1.00
Middle 40%	1.00 (0.66-1.51)	*1.41 (0.97-2.06)	1.50 (0.84-2.69)	1.41 (0.84-2.35)	1.50 (0.77-2.92)	0.94 (0.50-1.75)
Wealthiest 20%	0.92 (0.54-1.58)	1.01 (0.56-1.81)	1.03 (0.44-2.39)	1.10 (0.56-2.16)	1.11 (0.43-2.89)	0.98 (0.42-2.30)
Household distance to the HP in minutes travel time						
0-30	1.00	1.00	1.00	1.00	1.00	1.00
31-60	**0.54 (0.34-0.87)	***0.54 (0.37-0.80)	1.19 (0.68-2.08)	0.99 (0.59-1.67)	**2.19 (1.11-4.31)	**0.45 (0.24-0.84)
61-120	***0.52 (0.33-0.84)	***0.52 (0.36-0.76)	1.12 (0.62-2.03)	0.99 (0.56-1.76)	**2.14 (1.07-4.28)	**0.47 (0.24-0.91)
> 120	**0.46 (0.24-0.88)	**0.40 (0.19-0.81)	0.94 (0.41-2.17)	0.87 (0.36-2.09)	2.07 (0.84-5.10)	*0.42 (0.15-1.15)
Experienced previous child death						
No	1.00	1.00	1.00	1.00	1.00	1.00
Yes	0.76 (0.50-1.17)	0.91 (0.66-1.26)	1.09 (0.71-1.68)	1.19 (0.75-1.88)	1.43 (0.80-2.54)	0.83 (0.50-1.40)

a. Three multinomial logistic regression models estimated with base categories being alternately: 1) home care only; 2) health post; and 3) private

b. HP = health post

c. Home care only also includes no actions taken

d. HC = health center

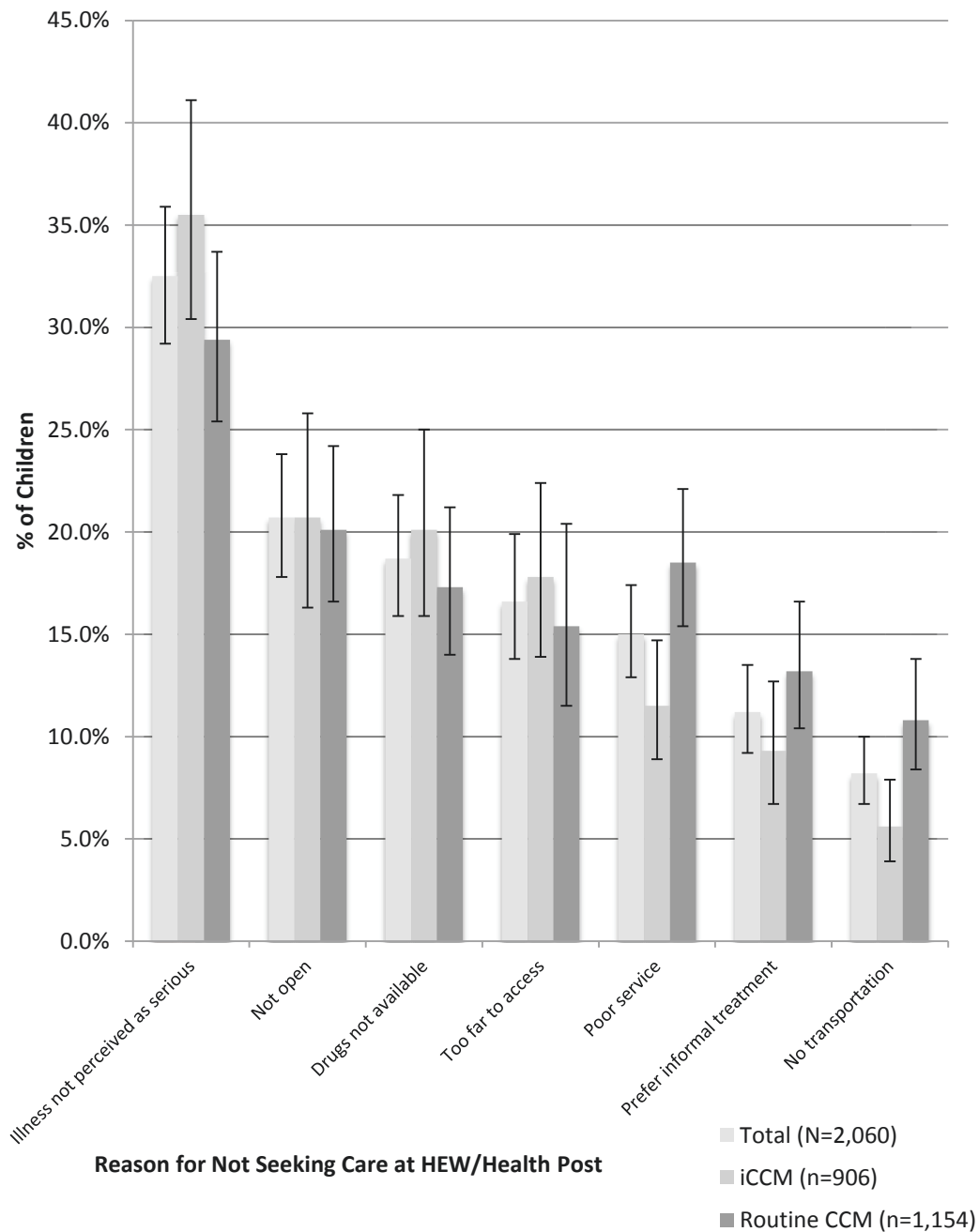
e. aRRR = adjusted relative risk ratio

* Significant at the $p < 0.10$ level

** Significant at the $p < 0.05$ level

*** Significant at the $p < 0.01$ level

Figure 3: Reported reasons for not seeking care from the HEW/health post among caregivers not utilizing the health post for children reported sick with diarrhea, fever and/or pneumonia in the two weeks preceding the survey, Jimma and West Hararghe zones, Oromia region, Ethiopia, 2013 (N=2,060)



Conclusions

1. Summary of findings

The strategy of iCCM is increasingly being adopted and scaled up in low-income countries. This strategy has been shown to successfully increase access to quality child health interventions and to reduce child mortality. However, scale up of this complex approach faces considerable challenges. As the number and scale of iCCM programs increase in sub-Saharan Africa, evidence on the strengths and weaknesses of existing programs is increasingly important. Challenges are often interrelated and exist at the policy, supply-side and demand-side levels. Significant improvements are occurring at the policy and supply-side levels in many settings. Despite these improvements, utilization of CHWs delivering iCCM services is often low. The importance of access barriers and demand-side factors is increasingly realized as a major bottleneck for improving the iCCM strategy and achieving goals program goals related to increasing coverage and reducing child mortality. These factors also are highly relevant for achieving these goals equitably and in a sustainable manner.

This study provides valuable information on reasons for low utilization of HEWs delivering iCCM services at the health post in the context of rapid program scale up in rural Ethiopia. Although the programmatic, health and sociocultural contexts of rural Ethiopia are in many ways unique, this study also provides lessons for iCCM scale up in other sub-Saharan African settings. Unlike many primary healthcare extension models in sub-Saharan Africa, many child health services are free and HEWs are paid for their services. As many countries move to reduce these significant barriers, others are coming to the fore. Many of these barriers are related to access and demand which can be

influenced by socioeconomic and sociocultural factors that are often broadly similar across many sub-Saharan African settings. Many of these settings are also characterized by medical pluralism with local healthcare systems encompassing a range of multiple informal and formal options. As other countries plan for scale up of iCCM, lessons from Ethiopia's experience may prove valuable.

This study demonstrates the importance of focusing on access barriers and demand factors for improving utilization of iCCM services. It provides information on salient factors from the perspective of caregivers themselves. Finally, it provides evidence on determinants of use of iCCM services. These findings are highly relevant for improvements in promoting utilization of iCCM services delivered by CHWs in rural settings.

1.1 Paper 1

In rural areas of Ethiopia, caregivers of sick children sought care from multiple sources within the landscape of available care and treatment options. Caregivers emphasized their efforts to achieve the best care possible care for their sick children within a context of considerable resource limitations and other health systems and sociocultural constraints. Decisions on the best strategy of care were often dynamic, contested and characterized by a considerable degree of uncertainty. They involved a wide range of social actors which often intensified over the course of a child's illness.

Most caregivers sought some form of care outside the home. While most caregivers expressed a strong desire for biomedical treatments from formal sources of care, the majority of care seeking took place in the informal sector. Care seeking from informal sources was often perceived as attractive based on successful previous

experiences, convenience and a low-cost opportunity to learn about an illness and a trial-and-error search for cure, especially for illnesses perceived as non-serious. It was also often based on social linkages connecting local sources of care to members of rural communities. The “power” of treatments available from providers was an important theme, often shaping care seeking strategies. While significant barriers were associated with formal sources of care, caregivers commonly associated these sources with the highest quality of care. The majority of caregivers perceiving their child’s condition to be serious sought care from formal sources. HEWs delivering child health services at the health post were often valued as trusted and knowledgeable community members. However, some populations felt excluded and mentioned a lack of trust in HEWs compared to other sources.

1.2 Paper 2

Most health post users interviewed in this study were motivated to use the health post and expressed a high degree of satisfaction with iCCM services. However, these caregivers faced many difficulties in accessing iCCM services. In particular, the absence of the HEW was frequently mentioned. This was particularly problematic for those communities with only one HEW staffing the health post. Other major challenges identified included inconvenient health post hours, especially during sudden changes in a child’s condition, the cost of transportation, geographic factors such as distance and difficult terrain and the lack of time given domestic and subsistence responsibilities.

Despite these challenges, health post users generally were able to call upon their social support networks for help mitigating their effects. In their care-seeking narratives, users tended to list a wide range of social support. The majority of users also suggested a

relatively high degree of decision making power or the ability to engage social support in overcoming resistance from gatekeepers. These factors were particularly important in explaining how caregivers living distant from the health post were able to overcome geographic barriers in accessing the health post. Many non-users similarly expressed a high degree of demand for health post services, but they were unable to overcome barriers due to a lack of social support and/or decision making power.

Acceptability of health post services was found to be particularly influential in decisions to use the health post. Acceptability was found to be low in areas that felt marginalized from health post services due to low engagement of particular sub-villages by the HEW. These sub-villages were often distant from the health post and frequently cited as having a high child illness burden. Other acceptability factors related to the perceived negative interactions between HEWs and communities, caregivers and children leading to a low degree of trust, perceptions about the appropriateness of health post services for illnesses not perceived as severe and the quality of drugs given to children at the health post.

1.3 Paper 3

This study found very low utilization of HEWs delivering child health services at community health posts by caregivers of children sick with diarrhea, fever and suspected pneumonia in rural areas of the Oromia region. The scale up of iCCM only marginally improves utilization of HEWs relative routine CCM services, and this effect largely disappears when controlling for other factors.

There were a number of predisposing, enabling and need characteristics of caregivers and sick children found to be associated with utilization of HEWs providing

iCCM services at the health post. There were differences in determinants between caregivers in areas receiving iCCM services compared to caregivers residing in areas providing routine CCM services. There is some indication that the iCCM strategy is leading to higher use by traditionally marginalized populations. In iCCM areas, caregivers with no formal education (potentially a proxy for socioeconomic status), were younger and female children were more likely to be taken to the health post. However, in iCCM areas, caregivers distant from the health post and of children less than one year's age were significantly less likely to use the health post. In iCCM areas, caregivers had higher awareness of the availability of treatments for child illness and knowledge of child illness danger signs as well as previous use of the HEW at the health post. These factors were significantly associated with increased odds for using the health post. Finally, children with pneumonia were at higher odds for taking their child to the health post compared to other illnesses, which was not seen in routine CCM areas. This study found no association between household wealth and utilization of HEWs at the health post in rural Ethiopia delivering iCCM services although maternal education might be a better indicator of socioeconomic status. While there were no differences in use of appropriate services between iCCM and routine CCM areas, caregivers in iCCM areas were more likely to go to the health post compared to higher levels of care, potentially leading to less burden on these facilities as well as on caregivers.

In this study, perceptions of low illness severity were given as the predominant reason for not using the HEW/health post. Other factors related to perceptions of service quality including general perceptions, the health post not being open and a lack of drugs

as well as distance. There was little difference in reasons for non-utilization between caregivers in iCCM areas compared to those in areas providing routine CCM services.

2. Strengths and Limitations

This research has several limitations inherent in qualitative research. In the qualitative studies, data relied on self-reported behaviors and the research team was likely perceived to be associated with the government and government sources of health care. Caregivers may have overemphasized socially desirable responses and care seeking from government and biomedical sources. Traditional and herbal medicines and informal drug vendors were highly criticized by government media, HEWs and community health volunteers. Researchers emphasized the independent nature of the research and probed for use of sources in a non-judgmental manner. Mothers in this area also begin childbirth at a young age and many young and potentially inexperienced mothers were missed due to the age requirements of the study. Hard-to-reach and busy caregivers (not at home) may have also been less likely to be selected. Selection of participants was conducted with the assistance of local community members which might have favored certain participants having particular characteristics of perspectives. However, multiple types of community members were engaged to assist and the research team often canvassed distant sub-villages to increase representation in hard-to-reach areas. Research at a given site proceeded over the course of two days, giving the research team opportunities to call again on participants who were not previously available. Potential errors in translation of transcripts were minimized through back-translation and engaging multiple data collectors in the translation process. Analysis was conducted with the assistance of independent researchers to reach consensus on a major themes.

Strengths of the qualitative research studies include triangulation of multiple methods, sites and perspectives from different populations. Thick narratives were elicited, with probes to enhance recall, providing in-depth information on caregivers' care-seeking behaviors and strategies. The research process was flexible and iterative to capture emerging themes. Sample size was based on the principle of data saturation, and sample size for the qualitative research was fairly large for this type of study design. Additional data checking was performed during debriefing with data collectors, program partners and UNICEF staff.

For the quantitative study, the study had a relatively large sample size with a high response rate (99%). The use of comparison districts allowed measurement of care seeking and determinants comparing those areas with the intervention (iCCM) to those without (routine CCM). The study questionnaire was based on standard questions used in large-scale household surveys in developing countries such as the DHS and MICS questionnaires. The use of laptop computers and CSPro in data collection allowed for consistency checks, minimizing data entry errors.

However, there were also a number of limitations. Self-reported symptoms were used to classify sick children and thus children may have been misclassified. However, this was followed with a series of further questions about the illness, potentially minimizing this possibility. Bias in recall was a potential problem in this study with caregivers being asked to remember things that happened in the past about an event that may not have been a major event in the home. This was minimized by limiting the recall period to two weeks. Interviewer and social desirability was potentially introduced and may have impacted sensitive topics such as care seeking from informal sources or

inflated rates of appropriate care seeking. Some differences in key Afan Oromo terms were observed between geographic settings (Jimma vs. West Hararghe) in the qualitative research, especially in relation to illnesses and symptoms as well as care sources. There may have been misunderstandings of terms used by data collectors in the questionnaire. Seasonality might have impacted the results. The survey was conducted during high malaria transmission season and may have overestimated care seeking for fever. Finally, the evaluation areas may not be representative of the entire country. The evaluation was conducted only in two zones and it is possible that programmatic, health and sociocultural contexts may differ between evaluation areas and other rural Ethiopian settings.

3. Public Health Significance

This research was commissioned by UNICEF Ethiopia to provide early feedback to stakeholders of the iCCM scale up including the Ethiopian FMoH, regional health bureaus and iCCM implementation partners. The primary motivation for this study was reports of low utilization of HEWs providing iCCM services.¹⁻² This study documented a number of reasons for low utilization with many amenable to public health actions that can be incorporated into the iCCM model for Ethiopia. The results have been disseminated to stakeholders, and the urgency of demand-generation activities has been recognized.

The findings from this study confirm that HEWs are only one option available for care and treatment of sick children in rural Ethiopia. We found that informal sources are widely used, often early in the care-seeking process. It appears that quantitative surveys may tend to miss out on some sources due to the use of particular terms and biases in

reporting possibly due to stigma associated with certain sources. Qualitative methodologies allow for a more comprehensive look and more in-depth exploration of sources and behaviors compared to quantitative approaches. Caregivers reported a number of advantages of informal sources relating to sociocultural beliefs and ease of access. At the same time, HEWs delivering child health services at the health post were widely seen as providing quality child health services and many caregivers expressed a desire to use the HEW/health post for their sick child. Nevertheless, many caregivers were unaware of the availability of child health services at the health post, were unfamiliar with the role of the HEW and reported a range of barriers to access including availability of the HEW, inconvenience of health post hours and concerns with secondary costs, geographic and distance challenges, interactions with HEWs and appropriateness of treatments at the health post. Social influences and, to a lesser extent, the gendered dynamics of household decision-making were also highly influential in determining access. Many of these findings were confirmed by the quantitative study which found distance and lack of awareness as major determinants of utilization of the HEW/health post and beliefs about the severity of a child's illness as a major reason for non-utilization.

The findings of this study have relevance beyond the Ethiopian context. CHWs cannot achieve their full potential without the active engagement of communities as collaborating and supportive partners.³ In order to develop child survival strategies that effectively address the need for treatment of potentially life-threatening childhood illness, program managers need to understand the populations with whom they work. Communities need to be partners in CHW and iCCM programs, with the opportunity to

participate in program design, selection of CHWs, siting of rural facilities and in providing oversight on CHW performance at the community level.⁴ This engagement should be inclusive of the wide range of social supports is needed to address the social nature of child health and care seeking. As well, given the continuing and large reliance on informal sources of care, engagement and collaboration rather than marginalization of these providers might make for a more responsive and beneficial local health care system and healthier children. Targeting of vulnerable populations and ensuring the quality of outreach activities including community mobilization and activities is essential. Despite improvements in supply of quality of iCCM services⁵ these efforts are not necessarily translating to increased utilization of services. Many caregivers reported few contacts with the HEWs/health post and held perceptions of services predating quality improvements. Given the considerable increases in likelihood for awareness and previous use, the importance of promoting both of these factors is critical.

The focus of attention is now shifting from implementation and scale up of iCCM to efforts to increase utilization of services. The scale up of the HDA is the main example of this shift, and this massive new program holds significant potential for minimizing many barriers outlined in this study and promoting demand for iCCM services. Members of the HDA will be expected to enhance many of the community mobilization and education activities delivered by HEWs, minimize a number of barriers outlined in this study and promote demand for iCCM services delivered at the health post. This initiative will reach deeper into communities, potentially reaching vulnerable populations, and bridging the many of the gaps between the HEW/health post and local communities. The

information on those gaps suggested by this study can improve their ability to recognize and respond to these gaps.

4. Recommendations for Future Research

This research was the first step in responding to an urgent need to understand reasons for low utilization of HEWs delivering iCCM services at rural community health posts. With a better understanding of care seeking behaviors and strategies, caregiver perceptions of barriers and determinants of utilization of the HEW/health post, it is now imperative to evaluate community-based interventions responding to these findings. The scale up of the Ethiopian HDA and its potential for increasing utilization of HEW/health posts services will be an excellent candidate for a rigorous effectiveness evaluation. As well, community and caregiver perceptions of the HDA initiative should be assessed for their acceptance by community members.

Given the findings relating to the influence of illness conceptions, in particular perceptions of severity of child illness, on HEW/health post utilization, more in-depth research on illness perceptions is needed. Recent reviews in sub-Saharan Africa testify to the importance of these factors in care seeking for child illness.⁶⁻⁷ Qualitative studies similar to the use of “diffusion of innovations” done by Nanyonjo et al.⁸ in Uganda could also be applied to Ethiopia in order to help further clarify acceptability, perceived benefits and social dynamics involved in the use of HEWs delivering iCCM services. The survey used for quantitative analysis in this study was limited and did not collect information on several important predisposing, enabling and need factors in Andersen’s and Kroeger’s models.⁹⁻¹⁰ It would be highly useful to have quantitative data on caregiver perceptions of illnesses and characteristics of health services, often included in other

studies of determinants of CHW utilization.¹¹⁻¹² Determinants of utilization of additional sources, especially health centers and private care sources will be useful in providing context for findings on determinants of utilization of the HEW/health post; particularly in understanding the phenomenon of by-passing of the HEW/health post. As well, the qualitative study suggested far more care seeking from informal sources than indicated by quantitative findings.¹⁻² Methods for increasing validity in surveys involving self-report of care seeking from certain sources such as traditional medicine and illegal drug vendors are necessary to get better understandings of the scope and range of informal care seeking.

This research was cross-sectional and did not account for changes in time. As the iCCM strategy matures, it will be important to continue to monitor changes in utilization, caregiver and community perceptions and determinants use. Wealth and distance of the household to the health post are two primary variables, often found associated with health services utilization.¹³ Although this study did not find strong quantitative associations with HEW/health post utilization, these were frequently described as barriers in the qualitative research. More precise methods of analysis of these variables are needed to assess whether iCCM scale up is encouraging equity as intended. As well, given the ultimate goal of iCCM in decreasing child mortality, quantitative research is needed to determine associations between use of iCCM services and likelihood of a child death.

References

1. Mela Research, PLC. *Baseline Coverage Survey for the Independent Prospective Evaluation of the Integrated Community Case Management (ICCM) in Oromia Region, Ethiopia: Draft Report*. Addis Ababa: Mela Research, PLC; 2011.
2. The Last Ten Kilometers Project (L10K). *Changes in Maternal, Newborn and Child Health in 115 Rural Woredas of Amhara, Oromia, SNNP and Tigray Regions of Ethiopia, 2008-2010: Findings from the L10K baseline and midterm surveys*. Addis Ababa: John Snow International (JSI) Research and Training Institute, Inc.; 2012.
3. Perry HB, Zulliger R, Rogers MM. Community health workers in low-, middle-, and high-income countries: an overview of their history, recent evolution, and current effectiveness. *Annual Review of Public Health*. 2014; **35**: 399-421.
4. Lehmann U, Sanders D. *Community Health Workers: What do We Know About Them? The State of the Evidence on Programs, Activities, Costs and Impact on Health Outcomes of Using Community Health Workers*. Geneva: WHO; 2007.
5. Miller N. *Integrated Community Case Management of Childhood Illness in Ethiopia: Implementation Strength and Quality of Care*. Dissertation Report. Baltimore: Johns Hopkins University; 2013.
6. Colvin CJ, Smith HJ, Swartz A, Ahs JW, de Heer J, Opiyo N, et al. Understanding careseeking for child illness in sub-Saharan Africa: A systematic review and conceptual framework based on qualitative research of household recognition and response to child diarrhea, pneumonia and malaria. *Social Science and Medicine*. 2013; 86(1): 68-78.

7. Geldsetzer P, Williams TC, Kirolos A, Mitchell S, Ratcliffe LA, Kohli-Lynch MK, et al. The recognition of and care seeking behaviour for childhood illness in developing countries: a systematic review. *PLoS One*. 2014; **9**(4): e93427.
8. Nanyonjo A, Nakirunda M, Makumbi F, Tomson G, Källander K; inSCALE Study Group. Community acceptability and adoption of integrated community case management in Uganda. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 97-104.
9. Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? *Journal of Health and Social Behavior*. 1995; **36**(1): 1-10.
10. Kroeger A. Anthropological and sociomedical health care research in developing countries. *Social Science and Medicine*. 1983; **17**(3): 47–161.
11. Kisia J, Nelima F, Otieno DO, Kiilu K, Emmanuel W, Sohani S, et al. Factors associated with utilization of community health workers in improving access to malaria treatment among children in Kenya. *Malaria Journal*. 2012; **11**: 248.
12. Mukanga D, Tibenderana JK, Peterson S, Pariyo GW, Kiguli J, Waiswa P, et al. Access, acceptability and utilization of community health workers using diagnostics for case management of fever in Ugandan children: a cross-sectional study. *Malaria Journal*. 2012; **11**: 121.
13. Rutherford ME, Mulholland K, Hill PC. How access to health care relates to under-five mortality in sub-Saharan Africa: systematic review. *Tropical Medicine and International Health*. 2010; **15**(5): 508-19.

Appendix 1: General focus group discussion guide for caregivers

Module 1

Q1

What are the main child health problems in your community?

Do many young children (under 5) die in this area?

What do they die from?

Q2

What causes malaria and what are the symptoms?

If a child has malaria, what should a mother do?

What causes diarrhea and what are the symptoms?

If a child has diarrhea, what should a mother do?

What causes pneumonia and what are the symptoms?

If a child has pneumonia, what should a mother do?

Module 2

Q3

For child illness, do you use traditional medicine/home remedies? What for?

Does your family use traditional medicine/spiritual healer for child illness?

What other sources are used for child illness? (Ask whether use, what for)

Q4

What kind of help do husbands/family provide when a child is ill?

Who else provides help when a child is ill? What do they do?

Q5

What cultural beliefs influence child illness and treatment seeking in your community?

Q6

Where do you get information about child illness?

What measures should be taken to improve the community's knowledge about child illness?

Module 3

Q7

What are the main challenges your family faces in going to the health post?

What are the reasons that some families do not take their child for treatment at the health post?

Does cost or distance make accessing the health post difficult?

Q8

What are the solutions to these challenges/barriers?

What can be done to improve the health of children in this area?

Appendix 2: General in-depth interview guide for caregivers

Module 1

Q1

What are the main child health problems in your community?

Do many young children (under 5) die in this area?

What do they die from?

Q2

When did you first notice that your child was sick?

What caused your child's illness?

What is the name of your child's illness?

What are the symptoms of your child's illness?

Module 2

Q3

When your child was sick with X, what actions did you take?

(prompt a narrative focusing on what was done, who child was taken to, who was involved in decisions, where child was taken, the amount of time elapsed between steps and why each step was taken)

Q4

When a child is ill, who do you tell?

What kind of help did your husband/family provide when your child is ill?

Who takes the decision to treat the child?

Who else provided help? What do they do?

Q5

Where do you get information about child illness?

Module 3

Q6

Depending on whether used health post, why or why not used?

What are the main challenges your family faces in going to the health post?

Did cost or distance make accessing the health post difficult?

Q7

What are the solutions to these challenges/barriers?

What can be done to improve the health of children in this area?

Appendix 3: General in-depth interviews for HEWs and volunteers

Module 1

Q1

What are the main child health problems in your community?

Do many young children (under 5) die in this area?

What do they die from?

Module 2 omitted

Module 3

Q2

In your opinion, why do caregivers take their child to the health post in this community?

In your opinion, why do caregivers not take their child to the health post in this community?

Where do caregivers take their children to get care and treatment for a sick child in this community?

Q3

Are there particular populations that do not use the health post? Why?

What kind of help did your husband/family provide when your child is ill?

Who takes the decision to treat the child?

Who else provided help? What do they do?

Q4

What are the solutions to these challenges/barriers?

What can be done to improve the health of children in this area?

Appendix 4: All references

- Addai I. Determinants of use of maternal-child health services in rural Ghana. *Journal of Biosocial Science*. 2000; **32**(1): 1-15.
- Admasu K. The implementation of the health Development Army: challenges, perspectives and lessons learned with a focus on Tigray's experience. *Policy and Practice, Federal Ministry of Health, Addis Ababa*. 2013; **5**(1): 3-7.
- Admassie A, Abebaw D, Woldemichael AD. Impact evaluation of the Ethiopian health services extension program. *Journal of Developmental Effectiveness*. 2009; **1**(4): 430-49.
- Adongo PB, Kirkwood B, Kendall C. How local community knowledge about malaria affects insecticide-treated net use in northern Ghana. *Tropical Medicine and International Health*. 2005; **10**(4): 366-78.
- Adugna A. *Ethiopian Demography and Health—Oromia*. Accessed 12 June 2012; 2010. Available from: <http://www.ethiodemographyandhealth.org/Oromia.html>.
- Agho KE, Dibley MJ, Odiase JI, Ogbonmwan SM. Determinants of exclusive breastfeeding in Nigeria. *BMC Pregnancy and Childbirth*. 2011; **11**: 2.
- Alvesson HM, Lindelow M, Khanthaphat B, Laflamme L. Coping with uncertainty during healthcare-seeking in Lao PDR. *BMC International Health and Human Rights*. 2013; **13**: 28.
- Amuyunzu M. Willing the spirits to reveal themselves: rural Kenyan mothers' responsibility to restore their children's health. *Medical Anthropology Quarterly*. 1998; **12**(4): 490-502.
- Anand S, Barnighausen T. Human resources and health outcomes: cross-country econometric study. *Lancet*. 2004; **364**(9445): 1603-9.

Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? *Journal of Health and Social Behavior*. 1995; **36**(1): 1-10.

Andersen RM, Newman JF. Social and individual determinants of medical care utilization in the United States. *Milbank Memorial Quarterly*. 1973; **51**(1): 95-124.

Ansah EK, Powell-Jackson T. Can we trust measures of healthcare utilization from household surveys? *BMC Public Health*. 2013; **13**: 853.

Assefa T, Belachew T, Tegegn A. Mothers' health care seeking behavior for childhood illnesses in Derra District, Northshoa Zone, Oromia Regional State, Ethiopia. *Ethiopian Journal of Health Sciences*. 2008; **18**(3): 87-94.

Ajayi IO, Browne EN, Garshong B, Bateganya F, Yusuf B, Agyei-Baffour P, et al. Feasibility and acceptability of artemisinin-based combination therapy for the home management of malaria in four African sites. *Malaria Journal*. 2008; **7**: 6.

Bakeera SK, Petzold M, Pariyo GW. Community social capital and the use of health care services in Uganda. *Journal of Public Health and Epidemiology*. 2010; **2**: 189-98.

Banteyerga H. Ethiopia's health extension program: improving health through community involvement. *MEDICC Review*. 2011; **13**(3): 46-9.

Baqui AH, Arifeen SE, Williams EK, Ahmed S, Mannan I, Rahman SM, et al. Effectiveness of home-based management of newborn infections by community health workers in rural Bangladesh. *Pediatric Infectious Disease Journal*. 2009; **28**(4): 304-10.

Barat LM, Palmer N, Basu S, Worrall E, Hanson K, Mills A. Do malaria control interventions reach the poor? A view through the equity lens. *American Journal of Tropical Medicine and Hygiene*. 2004; **71**(Suppl. 2): 174-8.

- Beiersmann C, Sanou A, Wladarsch E, de Allegri M, Kouyaté B, & Müller O. Malaria in rural Burkina Faso: local illness concepts, patterns of traditional treatment and influence on health-seeking behavior. *Malaria Journal*. 2007; **6**: 106.
- Berman P, Kendall C, Bhattacharyya K. The household production of health: integrating social science perspectives on micro-level health determinants. *Social Science and Medicine*. 1994; **38**(2): 205-15.
- Bhutta ZA, Chopra M, Axelson H, Berman P, Boerma T, Bryce J, et al. Countdown to 2015 decade report (2000-10): taking stock of maternal, newborn, and child survival. *Lancet*. 2010; **375**(9730): 2032-44.
- Bhutta Z, Lassi ZS, Pariyo G, Huicho L. *Global Experience of Community Health Workers for Delivery of Health Related Millennium Development Goals: A Systematic Review*. Geneva: Global Health Workforce Alliance, WHO; 2010.
- Bilal NK, Herbst CH, Zhao F, Soucat A, Lemiere C. Health extension workers in Ethiopia: improved access and coverage for the rural poor. In P. Chuhan-Pole, M. Angwafo (Eds.), *Yes Africa Can: Success Stories from a Dynamic Continent* (pp. 433-44). Washington, DC: World Bank; 2011.
- Birmeta K, Dibaba Y, Woldeyohannes D. Determinants of maternal health care utilization in Holeta town, central Ethiopia. *BMC Health Services Research*. 2013; **13**: 256.
- Black RE, Cousens S, Johnson HL, Lawn JE, Rudan I, Bassani DG, et al. Global, regional and national causes of child mortality in 2008: a systematic analysis. *Lancet*. 2010; **375**(9730): 1969-87.

Boerma JT, Bryce J, Kinfu Y, Axelson H, Victora CG. Mind the gap: equity and trends in coverage of maternal, newborn, and child health services in 54 Countdown countries. *Lancet*. 2008; **371**(9620): 1259-67.

Borghi J, Thapa B, Osrin D, Jan S, Morrison J, Tamang S, et al. Economic assessment of a women's group intervention to improve birth outcomes in rural Nepal. *Lancet*. 2005; **366**(9500): 1882-4.

Brenner JL, Kabakyenga J, Kyomuhangi T, Wotton KA, Pim C, Ntaro M, et al. Can volunteer health workers decrease child morbidity and mortality in Southwestern Uganda? An impact evaluation. *PLoS One*. 2011; **6**(12): e27997.

Briggs CJ, Garner P. Strategies for integrating primary health services in middle- and low-income countries at the point of delivery. *Cochrane Database of Systematic Reviews*. 2006; (2): CD003318.

Bryce J, Victora CG, Habicht JP, Black RE, Scherpbier RW. Programmatic pathways to child survival: results of a multi-country evaluation of Integrated Management of Childhood Illness. *Health Policy and Planning*. 2005; **20**(Suppl. 1): i5-17.

Buor D. Analyzing the primacy of distance in the utilization of health services in the Ahafo-Ano South district, Ghana. *International Journal of Health Planning and Management*. 2003; **18**(4): 293-311.

Callaghan-Koru JA, Seifu A, Tholandi M, de Graft-Johnson J, Daniel E, Rawlins B, et al. Newborn care practices at home and in health facilities in 4 regions of Ethiopia. *BMC Pediatrics*. 2013; **13**: 198.

Cassell JA, Leach M, Fairhead JR, Small M, Mercer CH. The social shaping of childhood vaccination practice in rural and urban Gambia. *Health Policy and Planning*. 2006; **21**(5): 373-91.

Center for National Health Development in Ethiopia. *Ethiopia Health Extension Program Evaluation Study, 2005-2007, Volume 1. Household Health Survey*. Addis Ababa: Center for National Health Development in Ethiopia; 2008.

Central Statistical Agency [Ethiopia], ORC Macro. *Ethiopia Demographic and Health Survey 2011*. Addis Ababa, Calverton: Central Statistical Agency [Ethiopia], ORC Macro; 2012.

Charmaz K. *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*. Thousand Oaks: Sage Publications; 2006.

Chatterjee P. Progress patchy on health-worker crisis. *Lancet*. 2011; **377**(9764): 456.

Chibwana AI, Mathanga DP, Chinkhumba J, Campbell Jr. CH. Socio-cultural predictors of health-seeking behavior for febrile under-five children in Mwanza-Neno district, Malawi. *Malaria Journal*. 2009; **8**: 219.

Christopher JB, le May A, Lewin S, Ross DA. Thirty years after Alma-Ata: a systematic review of the impact of community health workers delivering curative interventions against malaria, pneumonia and diarrhea on child mortality and morbidity in sub-Saharan Africa. *Human Resources for Health*. 2011; **9**(1): 27.

Chinbuah MA, Kager PA, Abbey M, Gyapong M, Awini E, Nonvignon J, et al. Impact of community management of fever (using antimalarials with or without antibiotics) on childhood mortality: a cluster-randomized controlled trial in Ghana. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 11-20.

- Chuma J, Gilson L, Molyneux C. Treatment-seeking behaviour, cost burdens and coping strategies among rural and urban households in Coastal Kenya: an equity analysis. *Tropical Medicine and International Health*. 2007; **12**(5): 673-86.
- Cochran WG. *Sampling Techniques*. 3rd ed. New York: Wiley; 1977.
- Collins S. *Community-Based Therapeutic Care: A New Paradigm for Selective Feeding in Nutritional Crises*. London: Humanitarian Practice Network (HPN), Overseas Development Institute (ODI); 2004.
- Colvin CJ, Smith HJ, Swartz A, Ahs JW, de Heer J, Opiyo N, et al. Understanding careseeking for child illness in sub-Saharan Africa: A systematic review and conceptual framework based on qualitative research of household recognition and response to child diarrhea, pneumonia and malaria. *Social Science and Medicine*. 2013; **86**(1): 68-78.
- Comoro C, Nsimba SE, Warsame M, Tomson G. Local understanding, perceptions and reported practices of mothers/guardians and health workers on childhood malaria in a Tanzanian district: implications for malaria control. *Acta Tropica*. 2003; **87**(3): 305-13.
- CORE Group, Save the Children, BASICS, MCHIP. (2010). *Community Case Management Essentials: Treating Common Childhood Illnesses in the Community. A Guide for Program Managers*. Washington, DC: CORE Group, Save the Children, BASICS, MCHIP; 2010.
- Cosminsky S, Mhloyi M, Ewbank D. Child feeding practices in a rural area of Zimbabwe. *Social Science and Medicine*. 1993; **36**(7): 937-47.
- Creswell JW. *Qualitative Inquiry and Research Design: Choosing among Five Approaches*. Thousand Oaks: Sage Publications; 2007.

Curtale F, Siwakoti B, Lagrosa C, LaRaja M, Guerra R. Improving skills and utilization of community health volunteers in Nepal. *Social Science and Medicine*. 1995; **40**(8): 1117-25.

Das JK, Lassi ZS, Salam RA, Bhutta ZA. Effect of community based interventions on childhood diarrhea and pneumonia: uptake of treatment modalities and impact on mortality. *BMC Public Health*. 2013; **13**(Suppl. 3): S29.

Dawson P, Pradhan Y, Houston R, Karki S, Poudel D, Hodgins S. From research to national expansion: 20 years' experience of community-based management of childhood pneumonia in Nepal. *Bulletin of the World Health Organization*. 2008; **86**(5): 339-43.

Degefe T, Marsh D, Gebremariam A, Tefera W, Osborn G, Waltensperger K.

Community case management improves use of treatment for childhood diarrhea, malaria and pneumonia in a remote district of Ethiopia. *Ethiopian Journal of Health Development*. 2009; **23**(1): 120-6.

Delacollete C, van der Stuyft P, Molima K. Using community health workers for malaria control: experience in Zaire. *Bulletin of the World Health Organization*. 1996; **74**(4): 423-30.

Deressa W. Treatment-seeking behavior for febrile illness in an area of seasonal malaria transmission rural Ethiopia. *Malaria Journal*. 2007; **6**(1): 49.

Deressa W, Ali A, Berhane Y. Household and socioeconomic factors associated with childhood febrile illnesses and treatment seeking behavior in an area of epidemic malaria in rural Ethiopia. *Transactions of the Royal Society of Tropical Medicine and Hygiene*. 2007; **101**(9), 939-47.

- De Savigny D, Mayombana C, Mwageni E, Masanja H, Minhaj A, Mkilindi Y, et al. Care-seeking patterns for fatal malaria in Tanzania. *Malaria Journal*. 2004; **3**: 27.
- Diaz T, George AS, Rao SR, Bangura PS, Baimba JB, McMahon SA, et al. Healthcare seeking for diarrhea, malaria and pneumonia among children in four poor rural districts in Sierra Leone in the context of free health care: results of a cross-sectional survey. *BMC Public Health*. 2013; **13**: 157.
- Dixon-Woods M1, Cavers D, Agarwal S, Annandale E, Arthur A, Harvey J, et al. Conducting a critical interpretive synthesis of the literature on access to healthcare by vulnerable groups. *BMC Medical Research Methodology*. 2006; **6**: 35.
- Doku D, Neupane S, Doku PN. 2012. Factors associated with reproductive health care utilization among Ghanaian women. *BMC International Health and Human Rights*. 2012; **12**: 29.
- Doocy S, Burnham G. Assessment of socioeconomic status in the context of food insecurity: implications for field research. *World Health and Population*, 2006; **8**(3): 32-42.
- Ellis AA, Doumbia S, Traoré S, Dalglish SL, Winch PJ. Household roles and care-seeking behaviours in response to severe childhood illness in Mali. *Journal of Biosocial Science*. 2013; **45**(6): 743-59.
- Ellis AA, Winch P, Daou Z, Gilroy KE, Swedberg E. Home management of childhood diarrhea in southern Mali: implications for the introduction of zinc treatment. *Social Science and Medicine*. 2007; **64**(3): 701-12.
- Ensor T, Cooper S. Overcoming barriers to health service access: influencing the demand side. *Health Policy and Planning*. 2004; **19**(2): 69-79.

Eriksen J, Nsimba SE, Minzi OM, Sanga AJ, Petzold M, Gustafsson LL, et al. Adoption of the new antimalarial drug policy in Tanzania: a cross-sectional study in the community. *Tropical Medicine and International Health*. 2005; **10**(10): 1038-46.

Ethiopia Ministry of Finance and Economic Development. *Ethiopia's Progress Towards Eradicating Poverty: An Interim Report on Poverty Analysis Study (2010/11)*. Addis Ababa: Development Planning and Research Directorate; 2012.

Fantahun M, Degu G. Health service utilization in Amhara region of Ethiopia. *Ethiopian Journal of Health Development*. 2003; **17**(2): 141-7.

Fantahun M, Berhane Y, Wall S, Byass P, Högberg U. Women's involvement in household decision-making and strengthening social capital-crucial factors for child survival in Ethiopia. *Acta Paediatrica*. 2007; **96**(4): 582-9.

Fasil T, Makonnen A, Fekadu A. Mothers' health services utilization and health care seeking behavior during infant rearing: West Ethiopia. *Ethiopian Journal of Health Development*. 2002; **16**(Special Issue): 51-8.

Federal Democratic Republic of Ethiopia Population Census Commission. *Summary and Statistical Report of the 2007 Population and Housing Census*. Addis Abbaba: Central Statistical Agency; 2012.

Federal Ministry of Health of Ethiopia (FMoH). *Health Extension Program in Ethiopia*. Addis Ababa: FMoH; 2007.

Filmer D, Pritchett L. Estimating wealth effects without expenditure data - or tearsan application to educational enrollments in states of India. *Demography*. 2001; **38**(1): 85-120.

- Friend-du Preez N, Cameron N, Griffiths P. Stuips, sputs and prophet ropes: the treatment of abantu childhood illnesses in urban South Africa. *Social Science and Medicine*. 2009; **68**(2): 343-51.
- Gage A. Barriers to the utilization of maternal health care in rural Mali. *Social Science and Medicine*. 2007; **65**(8): 1666-82.
- Garg R, Omwomo W, Witte JM, Lee LA, Deming MS. (2001). Care seeking during fatal childhood illnesses: Siaya District, Kenya, 1998. *American Journal of Public Health*. 2001. **91**(10): 1611-3.
- Garro L. On the rationality of decision-making studies: Part 1: Decision models of treatment choice. *Medical Anthropology Quarterly*. 1998; **12**(3): 319-40.
- Garro LC, Mattingly C. Narrative as construct and construction. In Garro LC, Mattingly C, eds., *Narrative and the Cultural Construction of Illness and Healing*. Oakland: University of California Press, 1–49; 2000.
- Geldsetzer P, Williams TC, Kirolos A, Mitchell S, Ratcliffe LA, Kohli-Lynch MK, et al. The recognition of and care seeking behaviour for childhood illness in developing countries: a systematic review. *PLoS One*. 2014; **9**(4): e93427.
- George A, Menotti EP, Rivera D, Marsh DR. Community case management in Nicaragua: lessons in fostering adoption and expanding implementation. *Health Policy and Planning*. 2010; **26**(4): 327-37.
- George A, Young M, Nefdt R, Basu R, Sylla M, Bannicq MY, et al. Community Case Management of Diarrhea, Malaria and Pneumonia: Tracking Science to Policy and Practice in Sub-Saharan Africa. New York: UNICEF; 2012.

George A, Young M, Nefdt R, Basu R, Sylla M, Clarysse et al. Community health workers providing government community case management for child survival in sub-Saharan Africa: who are they and what are they expected to do. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 85-91.

Gericke CA, Kurowski C, Ranson MK, Mills A. Intervention complexity—a conceptual framework to inform priority-setting in health. *Bulletin of the World Health Organization*. 2005; **83**(4): 285-93.

Getahun A, Deribe K, Deribew A. Determinants of delay in malaria treatment-seeking behaviour for under-five children in south-west Ethiopia: A case control study. *Malaria Journal*. 2010; **9**: 320.

Ghebreyesus TA, Witten KH, Getachew A, O'Neill K, Bosman A, Teklehaimanot A. Community-based malaria control in Tigray, northern Ethiopia. *Parassitologia*. 1999; **41**(1-3): 367-71.

Ghebreyesus TA, Witten KH, Getachew A, Yohannes AM, Tesfay W, Minass M, et al. The community-based malaria control program in Tigray, northern Ethiopia. A review of program set-up, activities, outcomes and impact. *Parassitologia*. 2000; **42**(3-4): 255-90.

Ghimire M, Pradhan YV, Maskey MK. Community-based interventions for diarrheal diseases and acute respiratory infections in Nepal. *Bulletin of the World Health Organization*. 2010; **88**(3): 216-21.

Greenwood BM, Bradley AK, Byass P, Greenwood AM, Menon A, Snow RW, et al. Evaluation of a primary health care programme in The Gambia. II. Its impact on mortality and morbidity in young children. *Journal of Tropical Medicine and Hygiene*. 1990; **93**(2): 87-97.

- Guest G, Bunce A, Johnson L. How many interviews are enough? An experiment with data saturation and variability. *Field Methods*. 2006; **18**(1): 59-82.
- Gyapong MG, Garshong B. *Lessons Learned in Home Management of Malaria: Implementation Research in Four African Countries*. Geneva: WHO; 2007.
- Gyimah SO, Takyi BK, Addai I. Challenges to the reproductive-health needs of African women: on religion and maternal health utilization in Ghana. *Social Science and Medicine*. 2006; **62**(12): 2930-44.
- Haines A, Sanders D, Lehmann U, Rowe AK, Lawn JE, Jan S, et al. Achieving child survival goals: potential contribution of community health workers. *Lancet*. 2007; **369**(9579): 2121-31.
- Hamer DH, Marsh DR, Peterson S, Pagnoni F. Integrated community case management: next steps in addressing the implementation research agenda. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 151-3.
- Hanson K, Ranson MK, Oliveira-Cruz V, Mills A. Expanding access to priority health interventions: a framework for understanding the constraints to scaling-up. *Journal of International Development*. 2003; **15**(1): 1-14.
- Hartford Web Publishing. *The History of the Federal Democratic Republic of Ethiopia: World History Archives*; 2012. Available from: <http://www.hartford-hwp.com/>. Accessed on June 16, 2012.
- Hausmann-Muela S, Ribera JM. Recipe knowledge: a tool for understanding some apparently irrational behavior. *Anthropology and Medicine*. 2003; **10**(1): 87-103.
- Health Extension and Education Center. *Health Extension Program in Ethiopia: Profile*. Addis Ababa: Health Extension and Education Center; 2007.

Hildenwall H, Rutebemberwa E, Nsabagasani X, Pariyo G, Tomson G, Peterson S. Local illness concepts: implications for management of childhood pneumonia in eastern Uganda. *Acta Tropica*. 2007; **101**(3): 217-24.

Hjortsberg C, Mwikisa C. Cost of access to health services in Zambia. *Health Policy and Planning*. 2002; **17**(1): 71-7.

Irimu G, Nduati RW, Wafula E, Lenja J. Community understanding of pneumonia in Kenya. *African Health Sciences*. 2008; **8**(2): 103-7.

Iyun BF, Oke EA. Ecological and cultural barriers to treatment of childhood diarrhoea in riverine areas of Ondo State, Nigeria. *Social Science and Medicine*. 2000; **50**(7-8): 953-64.

Jacobs B, Ir P, Bigdeli M, Annear PL, van Damme W. Addressing access barriers to health services: an analytical framework for selecting appropriate interventions in low-income Asian countries. *Health Policy and Planning*. 2012; **27**(4): 288-300.

Janzen JM. *The Quest for Therapy: Medical Pluralism in Lower Zaire*. Berkeley: University of California Press; 1978.

Johns Hopkins Bloomberg School of Public Health (JHSPH). *JHSPH Human Subjects Research Ethics Field Training Guide*. Baltimore: JHSPH; 2010.

Jones G, Steketee RW, Black RE, Bhutta ZA, Morris SS, et al. How many child deaths can we prevent this year? *Lancet*. 2003; **362**(9377): 65-71.

Kallander K, Nsungwa-Sabiiti J, Peterson S. Symptom overlap for malaria and pneumonia--policy implications for home management strategies. *Acta Tropica*. 2004; **90**(2): 211-4.

Kallander K, Tomson G, Nsabagasani X, Sabiiti JN, Pariyo G, Peterson S. Can community health workers and caretakers recognise pneumonia in children? Experiences from western Uganda. *Transactions of the Royal Society of Tropical Medicine and Hygiene*. 2006; **100**(10): 956-63.

Kalyango JN, Lindstrand A, Rutebemberwa E, Ssali S, Kadobera D, Karamagi C, et al. Increased use of community medicine distributors and rational use of drugs in children less than fever years of age in Uganda caused by integrated community case management of fever. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 36-45.

Kamat VR, Nyato DJ. Community response to artemisinin-based combination therapy for childhood malaria: a case study from Dar es Salaam, Tanzania. *Malaria Journal*. 2010; **9**: 1-9.

Kauchali S, Rollins N, van den Broeck J. Local beliefs about childhood diarrhoea: importance for healthcare and research. *Journal of Tropical Pediatrics*. 2004; **50**(2): 82-9.

Kelly JM, Osamba B, Garg RM, Hamel MJ, Lewis JJ, Rowe SY, et al. Community health worker performance in the management of multiple childhood illnesses: Siaya District, Kenya, 1997-2001. *American Journal of Public Health*. 2001; **91**(10): 1617-24.

Kengeya-Kayondo JF, Seeley JA, Kajura-Bajenja E, Kabunga E, Mubiru E, Sembajja F, et al. Recognition, treatment seeking behaviour and perception of cause of malaria among rural women in Uganda. *Acta Tropica*. 1994; **58**(3-4): 267-73.

Kidane G, Morrow RH. Teaching mothers to provide home treatment of malaria in Tigray, Ethiopia: a randomized trial. *Lancet*. 2000; **356**(9229): 550-5.

Kinfu Y, dal Poz MR, Mercer H, Evans DB. The health worker shortage in Africa: are enough physicians and nurses being trained? *Bulletin of the World Health Organization*. 2009; **87**(3): 225-30.

Kinney MV, Kerber KJ, Black RE, Cohen B, Nkrumah F, Coovadia H, et al. Sub-Saharan Africa's mothers, newborns, and children: where and why do they die? *PLoS Medicine*. 2010; **7**(6): e1000294.

Kisia J, Nelima F, Otieno DO, Kiilu K, Emmanuel W, Sohani S, et al. Factors associated with utilization of community health workers in improving access to malaria treatment among children in Kenya. *Malaria Journal*. 2012; **11**: 248.

Kleinman A. *Patients and Healers in the Context of Culture*. Berkeley: University of California Press; 1980.

Kleinman A., Eisenberg L., Good B. Culture, illness, and care: clinical lessons from anthropological and cross-cultural research. *Annals of Internal Medicine*. 1978; **88**(2): 251-88.

Kroeger A. Anthropological and sociomedical health care research in developing countries. *Social Science and Medicine*. 1983; **17**(3): 47–161.

Krueger RA, Casey MA. *Focus Groups: A Practical Guide for Applied Research*. 3rd ed. Thousand Oaks: Sage Publications; 2000.

Last Ten Kilometers Project (L10K). *Changes in Maternal, Newborn and Child Health in 115 Rural Woredas of Amhara, Oromia, SNNP and Tigray Regions of Ethiopia, 2008-2010: Findings from the L10K baseline and midterm surveys*. Addis Ababa: John Snow International (JSI) Research and Training Institute, Inc.; 2012.

- Leach MA, Fairhead JR, Millimouno D, Diallo AA. New therapeutic landscapes in Africa: Parental categories and practices in seeking infant health in the Republic of Guinea. *Social Science and Medicine*. 2008; **66**(10): 2157-67.
- Lehmann U, Sanders D. *Community Health Workers: What do We Know About Them? The State of the Evidence on Programs, Activities, Costs and Impact on Health Outcomes of Using Community Health Workers*. Geneva: WHO; 2007.
- Lewin S, Munabi-Babigumira S, Glenton C, Daniels K, Bosch-Capblanch X, van Wyk BE, et al. Lay health workers in primary and community health care for maternal and child health and the management of infectious diseases. *Cochrane Database of Systematic Reviews*. 2010; (3): CD004015.
- Lincoln Y, Guba E. But is it rigorous? Trustworthiness and authenticity in naturalistic evaluation. In W. Shadish, C. Reichardt (Eds.), *Evaluation Studies Review Annual*, 12th Ed. (Pp. 425-36). Newbury Park: Sage Publications; 1987.
- Liu L, Johnson HL, Cousens S, Perin J, Scott S, Lawn JE, et al. Global, regional, and national causes of child mortality: an updated systematic analysis for 2010 with time trends since 2000. *Lancet*. 2012; **379**(9832): 2151-61.
- Magadi M, Madise N, Rodrigues R. Frequency and timing of antenatal care in Kenya: explaining variation between women of different communities. *Social Science and Medicine*. 2000; **51**(4): 551-61.
- Makan B. *An Economic Analysis of Community Health Worker Programmes in the Western Cape Province*. Durban: HealthSystems Trust; 1997.
- Makemba AM, Winch PJ, Makame VM, Mehl GL, Premji Z, Minjas JN, et al. Treatment practices for degedege, a locally recognized febrile illness, and implications for strategies

to decrease mortality from severe malaria in Bagamoyo District, Tanzania. *Tropical Medicine and International Health*. 1996; **1**(3): 305-13.

Mackian S, Bedri N, Lovel H. Up the garden path and over the edge: where might health-seeking behavior take us? *Health Policy and Planning*. 2004; **19**(3): 137-46.

Mariam DH. Bridging the availability-utilization gap: the issue of quality in the provision of health care. *Ethiopian Journal of Health Development*. 2011; **25**(1): 1-2.

Marsh DR, Gilroy KE, van de Weerd R, Wansi E, Qazi S. Community case management of pneumonia: at a tipping point? *Bulletin of the World Health Organization*. 2008; **86**(5): 381-9.

Marsh DR, Hamer DH, Pagnoni F, Peterson S. Introduction to a special supplement: evidence for the implementation, effects, and impact of the integrated community case management strategy to treat childhood infection. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 2-5.

Mbachu CO, Onwujekwe OE, Uzochukwu BS, Uchegbu E, Oranuba J, Ilika AL. Examining equity in access to long-lasting insecticide nets and artemisinin-based combination therapy in Anambra State, Nigeria. *BMC Public Health*. 2012; **12**: 315.

McIntyre D, Thiede M, Birch S. Access as a policy-relevant concept in low- and middle-income countries. *Health Economics, Policy and Law*. 2009; **4**(2): 179-93.

Mebratie AD, Van de Poel E, Yilma Z, Abebaw D, Alemu G, Bedi AS. Healthcare-seeking behaviour in rural Ethiopia: evidence from clinical vignettes. *BMJ Open*. 2014; **4**(2): e004020.

Medhanyie A, Spigt M, Kifle Y, Schaay N, Sanders D, Blanco R, et al. The role of health extension workers in improving utilization of maternal health services in rural areas in Ethiopia: a cross sectional study. *BMC Health Services Research*. 2012; **12**: 352.

Mela Research, PLC. *Baseline Coverage Survey for the Independent Prospective Evaluation of the Integrated Community Case Management (ICCM) in Oromia Region, Ethiopia: Draft Report*. Addis Ababa: Mela Research, PLC; 2011.

Middlestadt SE, Bhattacharyya K, Rosenbaum J, Fishbein M, Shepherd M. The use of theory based semistructured elicitation questionnaires: formative research for CDC's Prevention Marketing Initiative. *Public Health Reports*. 1996; **111**(Suppl. 1): 18-27.

Miller N. *Integrated Community Case Management of Childhood Illness in Ethiopia: Implementation Strength and Quality of Care*. Dissertation Report. Baltimore: Johns Hopkins University; 2013.

Miller NP, Amouzou A, Tafesse M, Hazel E, Legesse H, Degefie T, et al. Integrated community case management of childhood illness in Ethiopia: implementation strength and quality of care. *American Journal of Tropical Medicine and Hygiene*. 2014; [Epub ahead of print].

Mogenson HO. False teeth and real suffering: the social course of 'germectomy' in eastern Uganda. *Culture, Medicine and Psychiatry*. 2000; **24**(3): 331-51.

Morse JM. The significance of saturation. *Qualitative Health Research*. 1995; **5**(2): 147-49.

175.

Mukanga D, Tibenderana JK, Peterson S, Pariyo GW, Kiguli J, Waiswa P, et al. Access, acceptability and utilization of community health workers using diagnostics for case

management of fever in Ugandan children: a cross-sectional study. *Malaria Journal*. 2012; **11**: 121.

Mukiira C, Ibisomi L. Health care seeking practices of caregivers of children under 5 with diarrhea in two informal settlements in Nairobi, Kenya. *Journal of Child Health Care*. 2013; [Epub ahead of print].

Murray J, Adeyi GN, Graeff J, Fields R, Rasmuson M, Salgado R, et al. *Emphasis Behaviors in Maternal and Child Health: Focusing on Caretaker Behaviors to Develop Maternal and Child Health Programs in Communities*. Arlington: BASICS; 1997.

Nanyonjo A, Nakirunda M, Makumbi F, Tomson G, Källander K; inSCALE Study Group. Community acceptability and adoption of integrated community case management in Uganda. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 97-104.

Nichter M. Social Science lessons from diarrhea research and their application to ARI. *Human Organization*. 1993; **52**(1): 53-67.

Njau JD, Goodman C, Kachur SP, Palmer N, Khatib RA, Abdulla A, et al. Fever treatment and household wealth: the challenge posed for rolling out combination therapy for malaria. *Tropical Medicine and International Health*. 2006; **11**(3): 299–313.

Noor A, Amin A, Gething P, Atkinson PM, Hay SI, Snow RW. Modelling distances travelled to government health services in Kenya. *Tropical Medicine and International Health*. 2006; **11**(2): 188-96.

Nsungwa-Sabiiti J, Peterson S, Pariyo G, Ogwal-Okeng J, Petzold MG, Tomson G. Home-based management of fever and malaria treatment practices in Uganda.

Transactions of the Royal Society of Tropical Medicine and Hygiene. 2007; **101**(12): 1199-207.

Nwokocha EE, Awomoyi AO. Factors influencing mothers' role in convulsion treatment among under-five children in Ibadan, Nigeria. *World Health and Population*. 2009; **11**(2): 15-29.

Nyamongo IK. Health care switching behaviour of malaria patients in a Kenyan rural community. *Social Science and Medicine*. 2002; **54**(3): 377-86.

O'Donnell O. 2007. Access to health care in developing countries: breaking down demand side barriers. *Cadernos de Saúde Pública*. 2007; **23**(12): 2820-34.

Ofovwe GE, Ibadin OM, Ofovwe EC, Okolo AA. Home management of febrile convulsion in an African population: a comparison of urban and rural mothers' knowledge attitude and practice. *Journal of the Neurological Sciences*. 2002; **200**(1-2): 49-52.

Okeke TA. Improving malaria recognition, treatment and referral practices by training caretakers in rural Nigeria. *Journal of Biosocial Science*. 2010; **42**(3): 325-39.

Omotade OO, Adeyemo AA, Kayode CM, Oladepo O. Treatment of childhood diarrhoea in Nigeria: need for adaptation of health policy and programmes to cultural norms.

Journal of Health, Population and Nutrition. 2000; **18**(3): 39-44.

Onarheim KH, Tessema S, Johansson KA, Eide KT, Norheim OF, Miljeteig I.

Prioritizing child health interventions in Ethiopia: modeling impact on child mortality, life expectancy and inequality in age at death. *PLoS One*. 2012; **7**(8): e41521.

Onwujekwe O, Dike N, Ojukwu J, Uzochukwu B, Ezumah N, Shu E, et al. Consumers stated and revealed preferences for community health workers and other strategies for the

provision of timely and appropriate treatment of malaria in southeast Nigeria. *Malaria Journal*. 2006; **5**: 117.

Opiyo P, Mukabana WR, Kiche I, Mathenge E, Killeen GF, Fillinger U. An exploratory study of community factors relevant for participatory malaria control on Rusinga Island, western Kenya. *Malaria Journal*. 2007; **6**: 48.

Orem JN, Mugisha F, Okui AP, Musango L, Kirigia JM. Health care seeking patterns and determinants of out-of-pocket expenditure for Malaria for the children under-five in Uganda. *Malaria Journal*. 2013; **12**: 175.

Oromia Regional Health Bureau (ORB). Health Sector Five year Plan (HSDP IV). Finfanne: ORHB; 2010.

Oxford Policy Management. *Lady Health Worker Programme: External Evaluation of the National Programme for Family Planning and Primary Health Care, Quantitative Survey Report*. Oxford: Oxford Policy Management; 2002.

Pandey MR, Sharma PR, Gubhaju BB, Shakya GM, Neupane RP, Gautam A, et al. Impact of a pilot acute respiratory infection (ARI) control programme in a rural community of the hill region of Nepal. *Annals of Tropical Paediatrics*. 1989; **9**(4): 212-20.

Parkhurst JO, Ssengooba F. Assessing access barriers to maternal healthcare: measuring bypassing to identify health center needs in rural Uganda. *Health Policy and Planning*. 2009; **24**(5): 377-84.

Pelto PJ, Pelto GH. Studying knowledge, culture and behavior in applied medical anthropology. *Medical Anthropology Quarterly*. 1997; **11**(2): 147-63.

Penchansky R, Thomas J. The concept of access: definition and relationship to consumer satisfaction. *Medical Care*. 1981; **19**(2): 127-40.

Perez F, Ba H, Dastagire SG, Altmann M. The role of community health workers in improving child health programs in Mali. *BMC International Health and Human Rights*. 2009; **9**: 28.

Perry HB, Zulliger R, Rogers MM. Community health workers in low-, middle-, and high-income countries: an overview of their history, recent evolution, and current effectiveness. *Annual Review of Public Health*. 2014; **35**: 399-421.

Peters DH, Garg A, Bloom G, Walker DG, Brieger WR, Rahman MH. Poverty and access to health care in developing countries. *Annals of the New York Academy of Sciences*. 2008; **1136**: 161-71.

Peterson S. Assessing the scale-up of child survival interventions. *Lancet*. 2010; **375**(9714): 530-1.

Pokhrel S. Scaling up health interventions in resource-poor countries: what role does research in stated-preference framework play? *Health Research Policy and Systems*. 2006; **4**: 4.

Pokhrel S, Sauerborn R. Household decision-making on child health care in developing countries: the case of Nepal. *Health Policy and Planning*. 2004; **19**(4): 218-33.

Rajaratnam JK, Marcus JR, Flaxman AD, Wang H, Levin-Rector A, Dwyer L. et al. Neonatal, postneonatal, childhood, and under-5 mortality for 187 countries, 1970-2010: a systematic analysis of progress towards Millennium Development Goal 4. *Lancet*. 2010; **375**(9730): 1988-2008.

Ram PK, Choi M, Blum LS, Wamae AW, Mintz ED, Bartlett AV. Declines in case management of diarrhea among children less than five years of age. *Bulletin of the World Health Organization*. 2008; **86**(3): E-F.

Reeler AV. Anthropological perspectives on injections: a review. *Bulletin of the World Health Organization*. 2000; **78**(1): 135-43.

Ricketts TC, Goldsmith LJ. Access in health services research: the battle of the frameworks. *Nursing Outlook*. 2005; **53**(6): 274-80.

Rosato M, Laverach G, Grabman LH, Tripathy P, Nair N, Mwansambo C, et al. Community participation: lessons for maternal, newborn and child health. *Lancet*. 2008; **372**(9642): 962-71.

Rutebemberwa E, Kadobera D, Katureebe S, Kalyango JN, Mworozzi E, Pariyo G. Use of community health workers for management of malaria and pneumonia in urban and rural areas in eastern Uganda. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 30-5.

Rutebemberwa E, Kallander K, Tomson G, Pariyo G. Determinants of delay in care-seeking for febrile children in eastern Uganda. *Tropical Medicine and International Health*. 2009; **14**(4): 472-9.

Rutebemberwa E, Nsabagasani X, Pariyo G, Tomson G, Peterson S, Kallander K. (2009). Use of drugs, perceived drug efficacy and preferred providers for febrile children: implications for home management of fever. *Malaria Journal*. 2009; **8**: 131.

Rutherford ME, Dockerty JD, Jasseh M, Howie SR, Herbison P, Jeffries DJ, et al. Access to health care and mortality of children under 5 years of age in the Gambia: a case-control study. *Bulletin of the World Health Organization*. 2009; **87**(3): 216-24.

Rutherford ME, Mulholland K, Hill PC. How access to health care relates to under-five mortality in sub-Saharan Africa: systematic review. *Tropical Medicine and International Health*. 2010; **15**(5): 508-19.

Ryan GW. What do sequential behavioral patterns suggest about the medical decision-making process?: Modeling home case management of acute illnesses in a rural Cameroonian village. *Social Science and Medicine*. 1998; **46**(2): 209-25.

Sasaki S, Fujino Y, Igarashi K, Tanabe N, Muleya CM, Suzuki H. Access to a health facility and care-seeking for danger signs in children: before and after a community-based intervention in Lusaka, Zambia. *Tropical Medicine and International Health*. 2010; **15**(3): 312-20.

Sazawal S, Black RE. Effect of pneumonia case management on mortality in neonates, infants, and preschool children: a meta-analysis of community-based trials. *Lancet Infectious Disease*. 2003; **3**(9): 547-56.

Sazawal S, Black RE. Meta-analysis of intervention trials on case-management of pneumonia in community settings. *Lancet*. 1992; **340**(8818): 528-33.

Sauerborn R, Adams A, Hien M. Household strategies to cope with the economic costs of illness. *Social Science and Medicine*. 1996; **43**(3): 291-301.

Sauerborn R, Nougara A, Diesfeld HJ. Low utilization of community health workers: results from a household interview survey in Burkina Faso. *Social Science and Medicine*. 1989; **29**(10): 1163-74.

Sauerborn R, Nougara A, Latimer E. The elasticity of demand for health care in Burkina Faso: differences across age and income groups. *Health Policy and Planning*. 1994; **9**(2): 186-92.

- Schellenberg JA, Victora CG, Mushi A, de Savigny D, Schellenberg D, Mshinda H, et al. Inequities among the very poor: health care for children in rural southern Tanzania. *Lancet*. 2003; **361**(9357): 561-6.
- Scott K, McMahon S, Yumkella F, Diaz T, George A. Navigating multiple options and social relationships in plural health systems: a qualitative study exploring healthcare seeking for sick children in Sierra Leone. *Health Policy and Planning*. 2013; [Epub ahead of print].
- Scrimshaw S, Hurtado E. *Rapid Assessment Procedures for Nutrition and Primary Health Care: Anthropological Approaches to Improving Program Effectiveness*. Tokyo: United Nations University; 1987.
- Sebastian MS, Lemma H. Efficiency of the health extension programme in Tigray, Ethiopia: a data envelopment analysis. *BMC International Health and Human Rights*. 2010; **10**: 16.
- Seidenberg PD, Hamer DH, Iyer H, Pilingana P, Siazele K, Hamainza B, et al. Impact of integrated community case management on health-seeking behavior in rural Zambia. *American Journal of Tropical Medicine and Hygiene*. 2012; **87**(Suppl. 5): 105-10.
- Snow RW, Mung'ala VO, Forster D, Marsh K. The Role of the District Hospital in Child Survival at the Kenyan Coast. *African Journal of Health Sciences*. 1994; **1**: 71-5.
- Sudhinaraset M, Ingram M, Lofthouse HK, Montagu D. What is the role of informal healthcare providers in developing countries? A systematic review. *PLoS One*. 2013; **8**(2): e54978.
- Taffa N, Chepnego G. Determinants of health care seeking for childhood illnesses in Nairobi slums. *Tropical Medicine and International Health*. 2005; **10**(3): 240-5.

- Teklehaimanot HD, Teklehaimanot A. Human resource development for a community-based health extension program: a case study from Ethiopia. *Human Resources for Health*. 2013; **11**(1): 39.
- Thaddeus S, Maine D. Too far to walk: maternal mortality in context. *Social Science and Medicine*. 1994; **38**(8): 1091–110.
- Thiede M. Information and access to health care: is there a role for trust? *Social Science and Medicine*. 2005; **61**(7): 1452-62.
- Tolhurst R, Amekudzi YP, Nyongato FK, Bertel Squire S, Theobald S. “He will ask why the child gets sick so often”: the gendered dynamics of intrahousehold bargaining over healthcare for children with fever in the Volta Region of Ghana. *Social Science and Medicine*. 2008; **66**(5): 1106-17.
- Tolhurst R, Nyongato FK. Looking within the household: gender roles and responses to malaria in Ghana. *Transactions of the Royal Society of Tropical Medicine and Hygiene*. 2006; **100**(4): 321-6.
- United Nations Children’s Fund (UNICEF). *Committing to Child Survival: A Promise Renewed Progress Report 2013*. New York: UNICEF; 2013.
- UNICEF. *Malaria and Children: Progress in Intervention Coverage*. New York: UNICEF; 2007.
- UNICEF. *Review of Systematic Challenges to the Scale-up of Integrated Community Case Management: Emerging Lessons and Recommendations from the Catalytic Initiative (CI / IHSS)*. New York: UNICEF; 2012.
- UNICEF. *State of the World’s Children: 2013 Report*. New York: United Nations Children’s Fund (UNICEF); 2013.

United Nations Development Program (UNDP). *Human Development Report 2013-- The Rise of the South: Human Progress in a Diverse World*. New York: UNDP; 2013.

United Nations General Assembly (UNGA). *United Nations Millennium Declaration. United Nations General Assembly Resolution 55/2*. New York: UNGA; 2000.

United Nations Interagency Group for Child Mortality Estimation (UN-IGME). *Levels and Trends in Child Mortality: The 2013 Report*. New York: UNICEF; 2013.

Van der Geest S. Overcoming ethnocentrism: how social science and medicine relate and should relate to one another. *Social Science and Medicine*. 1995; **40**(7): 869-72.

Van der Geest S. Pharmaceuticals in the Third World: the local perspective. *Social Science and Medicine*. 1987; **25**(3): 273-6.

Van Malderen C, van Oyen H, Speybroeck N. Contributing determinants of overall and wealth-related inequality in under-5 mortality in 13 African countries. *Journal of Epidemiology and Community Health*. 2013; **67**(8): 667-76.

Victora CG, Fenn B, Bryce J, Kirkwood BR. Co-coverage of preventative interventions and implications for child-survival strategies: evidence from national surveys. *Lancet*. 2005; **366**(9495): 1460-6.

Victora CG, Vaughan JP, Barros FC, Silva AC, Tomasi E. Explaining trends in inequities: evidence from Brazilian child health studies. *Lancet*. 2000; **356**(9235): 1093-8.

Victora CG, Wagstaff A, Schellenberg JA, Gwatkin D, Claeson M, Habicht JP. Applying an equity lens to child health and mortality: more of the same is not enough. *Lancet*. 2003; **362**(9379): 233-41.

Wang'ombe JK. Economic evaluation in primary health care: the case of Western Kenya community based health care project. *Social Science and Medicine*. 1984; **18**(5): 375-85.

Warsame M, Kimbute O, Machinda Z, Ruddy P, Melkisedick M, Peto T, Ribeiro I, et al. Recognition, perceptions and treatment practices for severe malaria in rural Tanzania: implications for accessing rectal artesunate as a pre-referral. *PLoS One*. 2007; **2**(1): e149.

Waters H. *The Costing of Community Maternal and Child Health Interventions: A Review of the Literature with Applications for Conducting Cost-Effectiveness Studies and for Advocacy*. New York: Interagency Working Group on Integrated Management of Child Illness (IMCI), UNICEF; 2000.

Whyte SR. *Questioning Misfortune. The Pragmatics of Uncertainty in Eastern Uganda*. Cambridge: Cambridge University Press; 1997.

Winch PJ, Doumbia S, Kanté M, Malé AD, Swedberg E, Gilroy KE., et al. Differential community response to introduction of zinc for childhood diarrhoea and combination therapy for malaria in southern Mali. *Journal of Nutrition*. 2008; **138**(3): 642-5.

Winch PJ, Gilroy KE, Wolfheim C, Starbuck ES, Young MW, Walker LD, et al. Intervention models for the management of children with signs of pneumonia or malaria by community health workers. *Health Policy and Planning*. 2005; **20**(4): 199-212.

Winch PJ, Leban K, Casazza L, Walker L, Percy K. An implementation framework for household and community integrated management of childhood illness. *Health Policy and Planning*. 2002; **17**(4): 345-53.

World Bank. *World Development Indicators*. Washington, DC: Development Data Group, World Bank; 2013.

World Health Organization (WHO). *Declaration of Alma-Ata: International Conference on Primary Health Care*. Alma-Ata: WHO; 1978.

WHO. *Working Together for Health: The World Health Report, 2006*. Geneva: World Health Organization (WHO); 2006.

WHO, UNICEF. *Countdown to 2015: Accountability for Maternal, Newborn and Child Survival*. Geneva, New York: WHO, UNICEF; 2013.

WHO, UNICEF. *Integrated Management of Childhood Illness: Caring for Newborns and Children in the Community. Manual for the Community Health Worker*. Geneva, New York: WHO, UNICEF; 2011.

WHO, UNICEF. *Joint Statement: Clinical management of acute diarrhea*. Geneva. New York: WHO, UNICEF; 2004.

WHO, UNICEF. *Joint Statement on the Community-based Management of Severe Acute Malnutrition*. Geneva. New York: WHO, UNICEF; 2007.

WHO, UNICEF. *WHO and UNICEF Joint Statement: Management of Pneumonia in Community Settings*. Geneva, New York: WHO, UNICEF; 2004.

Worku AG, Yalew AW, Afework MF. Factors affecting utilization of skilled maternal care in Northwest Ethiopia: a multilevel analysis. *BMC International Health and Human Rights*. 2013; **13**: 20.

Yeboah-Antwi K, Pilingana P, MacLeod WB, Semrau K, Siazeele K, Kalesha P, et al., Community case management of fever due to malaria and pneumonia in children under five in Zambia: a cluster randomized controlled trial. *PLoS Medicine*. 2010; **7**(9): e1000340.

- Yitayal M, Berhane Y, Worku A, Kebede Y. Health extension program factors, frequency of household visits and being model households, improved utilization of basic health services in Ethiopia. *BMC Health Services Research*. 2014; **14**(1): 156.
- Young A. An anthropological perspective on medical knowledge. *Journal of Medicine and Philosophy*. 1980; **5**(2): 102-16.
- Young JC. *Medical Choice in a Mexican Village*. New Brunswick: Rutgers University Press; 1981.
- Young M, Wolfheim C, Marsh DR, Hammamy D. World Health Organization/United Nations Children's Fund joint statement on integrated community case management: an equity-focused strategy to improve access to essential treatment services for children. *American Journal of Tropical Medicine & Hygiene*. 2012; **87**(Suppl. 5): 6-10.

Appendix 4: Curriculum Vitae

BRYAN C. SHAW MPH, MS, PhD(c)

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PROFESSIONAL PROFILE

Public health professional specializing in topical areas of child survival and HIV/AIDS. Five years experience as an international public health consultant and researcher and more than two years experience working in domestic public health and social issues in diverse and vulnerable populations. Specialize in mixed-methods research and community health programs. Extensive and diverse experience in research design, monitoring and evaluation, operational research, capacity building and community mobilization and education. Doctoral and master's-level studies in public health and medical anthropology.

EXPERIENCE

Research Fellow, Johns Hopkins Bloomberg School of Public Health, Department of International Health

Addis Ababa, Ethiopia and Baltimore, USA; January 2012-present

- Serving as the representative of the Institute for International Programs at the Johns Hopkins Bloomberg School of Public Health in Ethiopia as part of a multi-country evaluation of the Catalytic Initiative, a UNICEF-led initiative to scale-up integrated community case management of common childhood illnesses (diarrhea, malaria, pneumonia and malnutrition) and reduce child mortality.
- Trained, coordinated and provided technical assistance for 120 data collectors in the completion of a 28,000 household randomized cluster survey to measure child mortality and coverage of effective treatment for childhood illnesses.
- Led a three-month qualitative study to explore care-seeking behaviors for common childhood illnesses and factors affecting utilization of community-based health workers (CBHWs).
- Organized budgeting for 1.2 million USD survey and qualitative study.
- Contributing to on-going analysis of study findings, publications, working reports and partner meetings.

Research Consultant, Alliance for Better Health in Partnership with Save the Children/USA

Addis Ababa, Ethiopia; December 2012-May 2013

- Conducted mixed-methods evaluation of selected components of the TRANSAction Project among most at-risk populations for HIV/AIDS in Ethiopia.
- Completed project report focusing on influence of economic strengthening on risky sexual behaviors for at-risk populations in Ethiopia.

Research Associate, Global Health Fellows Program (GHFP), Public Health Institute (PHI) with USAID

Washington DC, USA and Maputo, Mozambique; June 2011-December 2011

- Served as intern for HIV/AIDS Community Care and Prevention department within the GHFP-II.

- Coordinated and provided technical assistance for local partners in C-Change Initiative, a social and behavioral communication change (BCC) initiative run by Family Health International 360 (FHI360). Backstopped involvement in three countries: Mozambique, Uganda and Ethiopia. Traveled to Mozambique to provide technical support for C-Change and other country mission, community care and prevention activities.
- Contributed to multiple technical reports on: social marketing, BCC, demand generation, positive prevention and CBHWs in relation to high-risk populations.
- Managed USAID community-based HIV care and positive prevention content for website.

Teaching Assistant, Johns Hopkins Bloomberg School of Public Health, Department of International Health

Baltimore MD, USA; August 2009-May 2011

- Supported instructors in preparing and delivering lectures.
- Assisted in classes including: community-based participatory research, community-based primary health care, social and behavioral intervention design, international health and qualitative research methods.

Innovations Program Intern, Concern Worldwide/United Nations Children's Fund (UNICEF)

Bhubaneswar, India and New York, USA; May 2010-December 2010

- Served as maternal, newborn and child health (MNCH) intern for Innovations project—a collaboration between Concern Worldwide, UNICEF and local Ministries of Health seeking to generate new and innovative ideas to improve coverage of effective health services and the health of women, newborns and young children in six countries.
- Conducted formative and operations research studies and identified implementation partners for planned MNCH interventions.
- Participated in technical committee to design interventions based on winning ideas.
- Produced draft report evaluating activities from first iteration of Innovations project in the state of Orissa.

Program Evaluation Consultant, Future Generations

Arunachal Pradesh, India and Baltimore MD, USA; December 2009-March 2010

- Conducted a qualitative evaluation of activities for Future Generations Arunachal, India—focusing on livelihoods interventions and a range of health outcomes.
- Produced a case study report evaluating Future Generation's livelihoods interventions and their impact on community health.

Research Consultant, Program for Appropriate Technology in Health (PATH)

Baltimore MD, USA and Lusaka, Zambia; October 2009-December 2009

- Served as qualitative research consultant for PATH's Infant and Young Child Nutrition (IYCN) project activities in Zambia focusing on improving infant feeding to protect newborns from HIV.
- Conducted qualitative methods workshop for research assistants and conducted qualitative and basic quantitative analyses for research on maternal nutrition, breastfeeding and child nutrition.
- Coordinated with quantitative evaluation team to produce mixed methods report on improving infant feeding in mothers with HIV.

Research Assistant, North Texas Veterans Administration Hospital, Department of Rheumatology

Dallas TX, USA; January 2009-August 2009

- Participated in research team involving clinicians and social scientists.

- Maintained extensive database focusing on autoimmune disorders in military veterans.
- Participated in research team generating questions from database and designing multiple randomized control trial research studies.

Research and Program Design Consultant/Project Manager, YearOut India

Kerala, India; January 2008-December 2008

- Served as program design consultant focusing on health and livelihoods projects for a population of indigenous tribal groups in Kerala, India.
- Conducted ethnographic research as part of master's thesis project to explore and document health needs for this population.
- Identified local and international volunteers with health and livelihoods expertise to assist in designing and implementing health and livelihoods interventions.
- Facilitated a team of program staff, volunteers, and community members in designing interventions meeting community needs and based on health volunteers' skills and abilities.

Research Assistant, University of North Texas Health Science Center, Department of Epidemiology

Fort Worth TX, USA; August 2007-November 2007

- Participated in Auntie Tia Birthing project focusing on improving birth outcomes among minority and low-income populations in Dallas and Fort Worth.
- Participated as supervisor of data collection team conducting surveys and as quantitative research analyst.

Research Consultant, Dibrugarh University

Assam, India; May 2007-August 2007

- Served as consultant for professor-initiated project looking at impact of flooding on livelihoods and health of minority and indigenous populations in Assam.
- Conducted participant observation, unstructured interviews and qualitative analysis and produced report outlining impact of floods on livelihoods and health of minority and indigenous populations in Assam.

Volunteer, AmeriCorps/Volunteers in Service to America (VISTA)

Puyallup WA, USA May 2005-May 2006

- Served as VISTA volunteer and designated to a locally-based, non-governmental organization (NGO) focusing on getting housing, healthcare, job training and nutritional assistance for homeless families.
- Worked in team of grant writers to secure funding for the NGO.

EDUCATION

Doctor of Philosophy (PhD) candidate in Social and Behavioral Interventions, International Health
Johns Hopkins University Bloomberg School of Public Health, Baltimore MD, USA; 2009-present

(May 15 expected graduation date)

Certificate in Humanitarian Assistance; Completed requirements 2011

Masters of Public Health (MPH) in Behavioral and Community Health

University of North Texas Health Science Center, Fort Worth TX, USA; Graduated 2008 (with honors)

Masters of Science (MS) in Applied Anthropology, Medical Anthropology

University of North Texas, Denton TX, USA; Graduated 2008 (with honors)

Bachelor of Arts (BA) in Anthropology

University of Iowa, Iowa City IA, USA; Graduated 2005

LANGUAGES

Native English; intermediate spoken and written Spanish; beginning spoken and written French

VOLUNTEERING

YearOut India; 2008-present

Real Foods Farm Baltimore Urban Garden Initiative; 2010-2011

International Rescue Committee (IRC); 2008-2010

Medical Reserve Corps; 2008-2009

AmeriCorps/VISTA; 2005-2006

PROFESSIONAL AFFILIATIONS

American Public Health Association (APHA); 2008-present

Society for Applied Anthropology (SfAA); 2006-present

National Association for the Practice of Anthropology (NAPA); 2006-2010

TECHNICAL REPORTS

Shaw B. *An Assessment of Economic Strengthening and Risky Sexual Behavior among Vulnerable Women Groups in Selected Towns of Ethiopia*. ABH Services, PLC. 2013.

Shaw B. *A Qualitative Assessment of Factors Limiting Care Seeking for Sick Children from Community-Based Health Workers in Oromia Region, Ethiopia*. IIP. 2013.

Shaw B, Corey S. *Evidence Review: Community-based Health Workers in HIV Programs*. USAID. 2011

Hempstone H, Shaw B. *Evidence Review: Social and Behavioral Interventions for Positive Prevention*. USAID. 2011.

Shaw B. *Situation and Response Analysis for Keonjhar District, Orissa: Feasibility of Male Community Health Workers Delivering MNCH Interventions*. Concern Worldwide. 2010.

Shaw B, Calder J. *A Case Study of Future Generation's Livelihoods Activities in Arunachal Pradesh*. Future Generations. 2010.

Shaw B, Singh N. *Influences on Maternal Nutrition of HIV+ Mothers in Urban Zambia*. PATH. 2009.

Shaw B. *Community-Based Health Needs Assessment: Mannan Community of Kozhimala*. UNTHSC. 2008.

SKILLS AND ACTIVITIES

- Qualitative research methods including: situation and response analyses, ethnography, participatory research, rapid rural appraisal (RRA), knowledge, attitudes and practices (KAP) surveys, case studies and formative research. Qualitative research techniques including: focus

group discussions, in-depth interviews, key informant interviews and participatory techniques. Qualitative analysis including: ethnographic, grounded theory and thematic analysis.

- Quantitative research methods including: randomized control trials and equity studies focusing on monitoring and evaluation and health systems strengthening. Quantitative analysis including: factor analysis, bivariate and multivariate analysis.
- Training research teams in qualitative and quantitative methods.
- Translating research findings into intervention designs.
- Software proficiency: Microsoft Office, MS Access, Epi Info, Stata, SPSS, Atlas.ti, NVivo, Anthropac, CSPro, UCINET, WHO Anthro and the Lives Saved Tool (LiST).
- Knowledge of Sphere standards for humanitarian health programs.
- Knowledge of BCC and social marketing interventions.
- Writing publications, technical working reports and country briefs and conducting partner meetings and research dissemination briefings.
- Working with multiple research and intervention partners at the international, national and community levels.
- Experience in grant writing.
- Experience in website design and content writing.